Capital Taxation

230B: Public Economics
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MOTIVATION

Capital income is income generated from wealth

1) Capital income is about 25% of national income (labor income is 75%) but growing and distribution of capital income is much more unequal than labor income

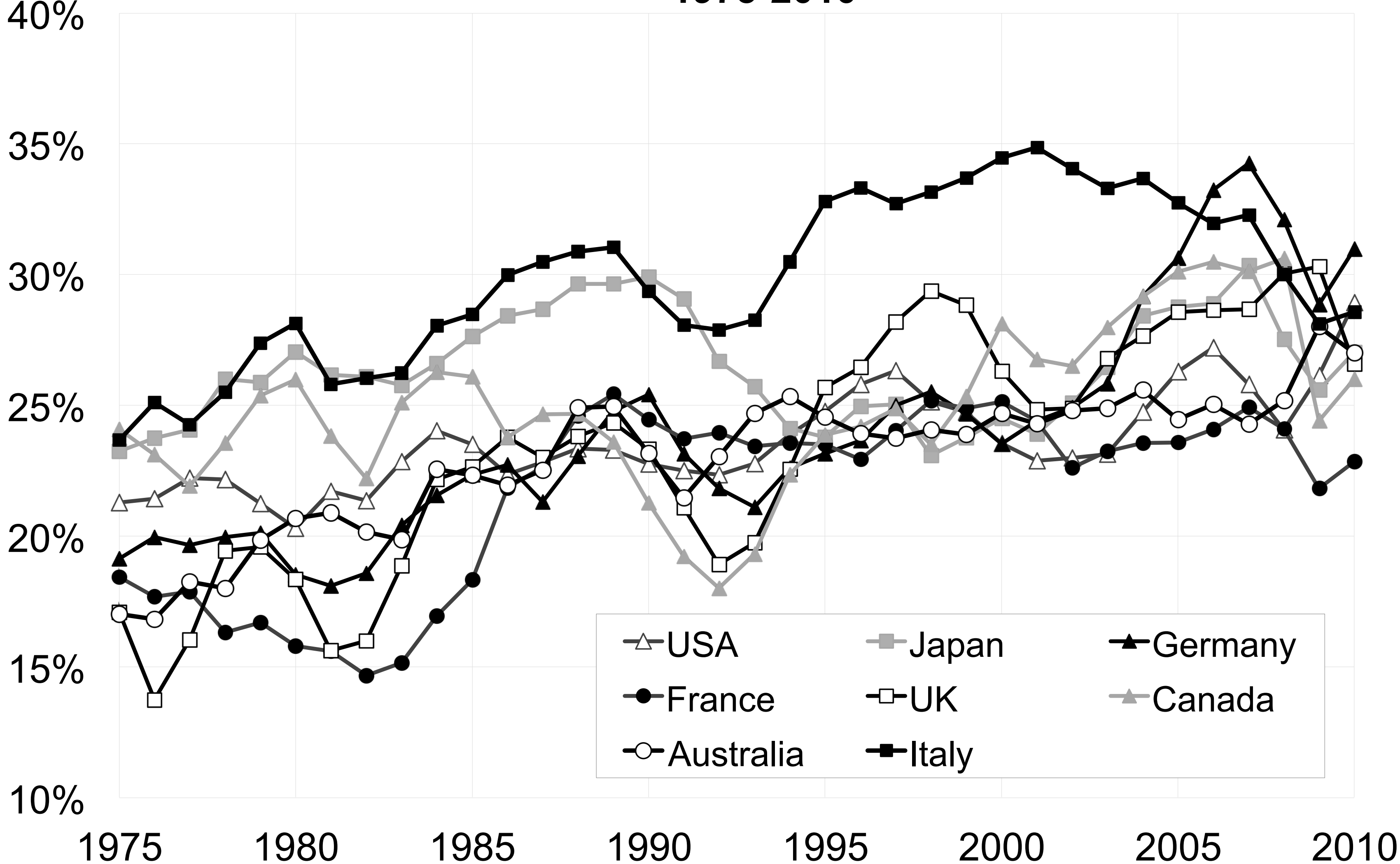
Capital income inequality is due to differences in savings behavior but also inheritances received

$\Rightarrow$ Equity suggests it should be taxed more than labor

2) Capital Accumulation correlated strongly with growth [although causality link is not obvious] and capital accumulation might be sensitive to the net-of-tax return.

$\Rightarrow$ Efficiency cost of capital taxation might be high.

Figure 12: Capital shares in factor-price national income 1975-2010



Source: Piketty and Zucman (2014)

MACRO FRAMEWORK

Constant return to scale aggregate production:

$Y = F(K, L) = rK + wL =$ output $=$ income

$K =$ capital stock (wealth), $L =$ labor input

$r =$ rate of return on capital, w is wage rate

$rK =$ capital income, $wL =$ labor income

$\alpha = rK/Y =$ capital income share (constant α when $F(K, L) = K^{\alpha}L^{1-\alpha}$ Cobb-Douglas), $\alpha \simeq 30\%$

$\beta = K/Y =$ wealth to annual income ratio, $\beta \simeq 4-6$

$r = (rK/Y) \cdot (Y/K) = \alpha/\beta$, $r = 5-6\%$

FACTS ABOUT WEALTH

Wealth is value of privately owned and marketable assets

Wealth arises from expected future income and value of assets

Private wealth includes real estate (land+buildings), corporate and business equity, fixed claimed assets (bonds+deposits), net of debts (mortgage, student loans, consumer credit)

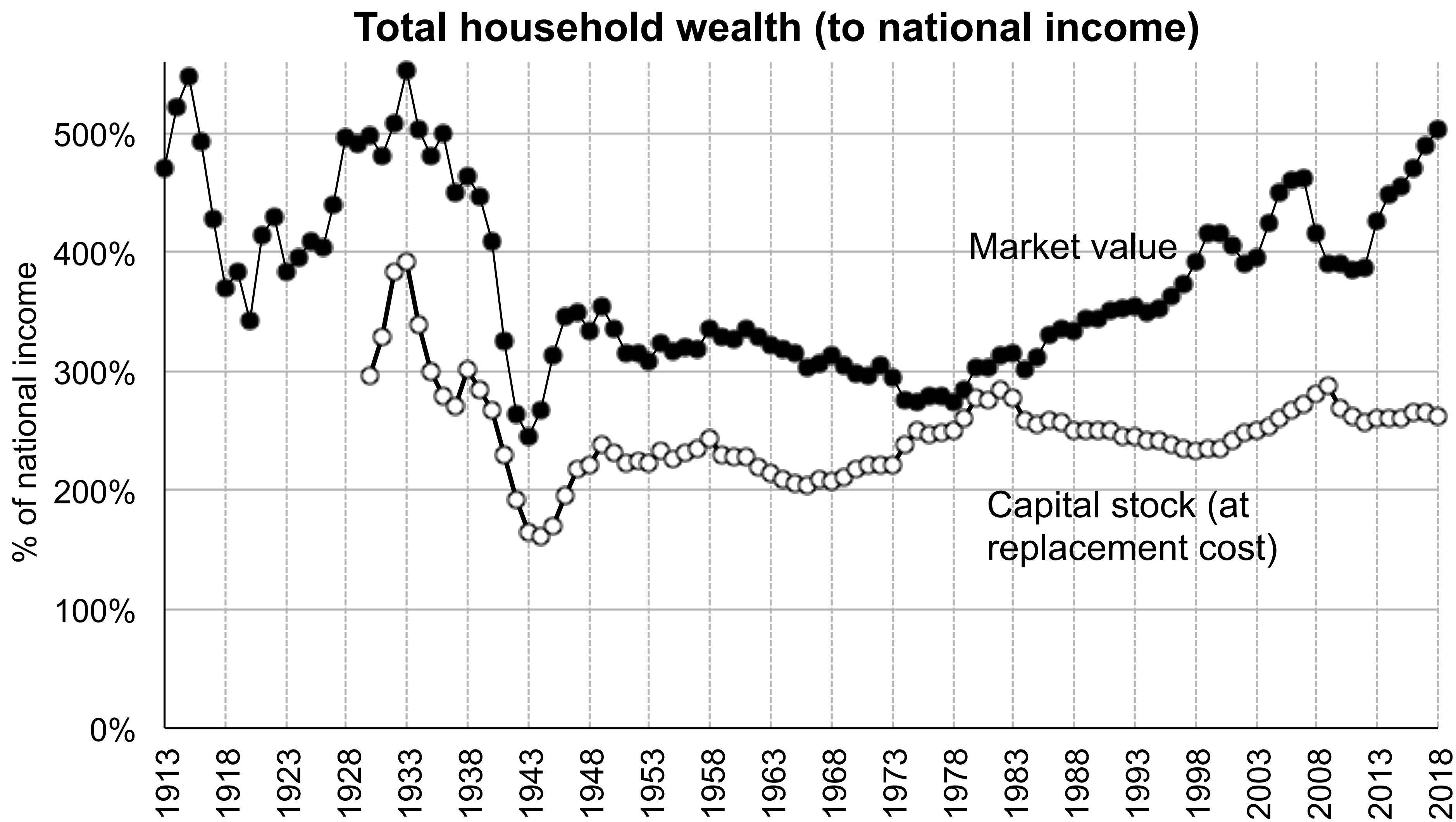
Aggregate US **Private** Wealth $\simeq 6\times$Annual National Income (big increase in recent years)

Total wealth reflects both **capital stock accumulated through savings** and **pure price effects**

Example 1: house can increase in value because it is improved (capital) or because local prices go up (pure price effect)

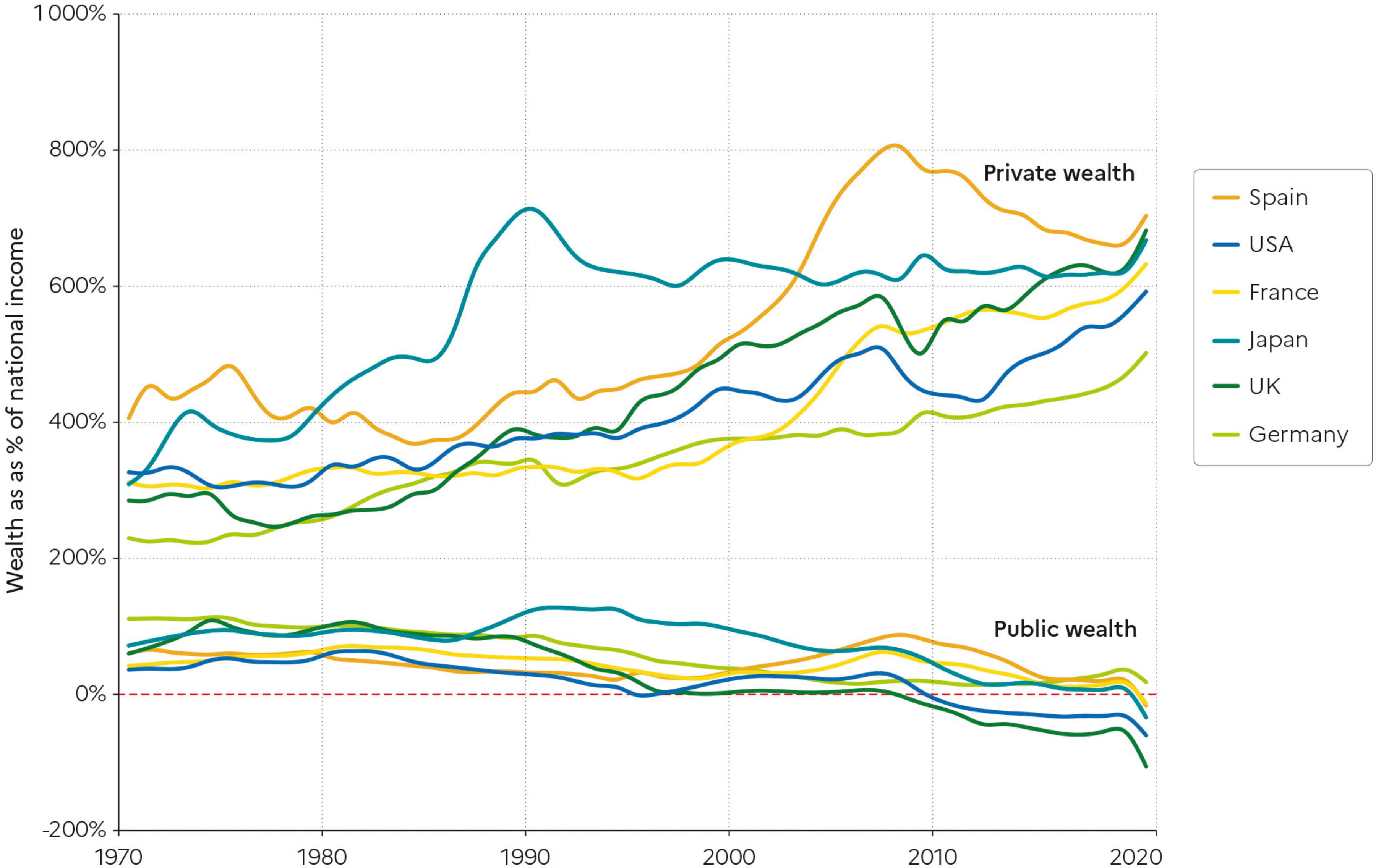
Example 2: greater monopoly power makes a business more valuable to owners (but at the expense of consumers) with no change in operating capital

Recent increase in US private wealth mostly due to price effects



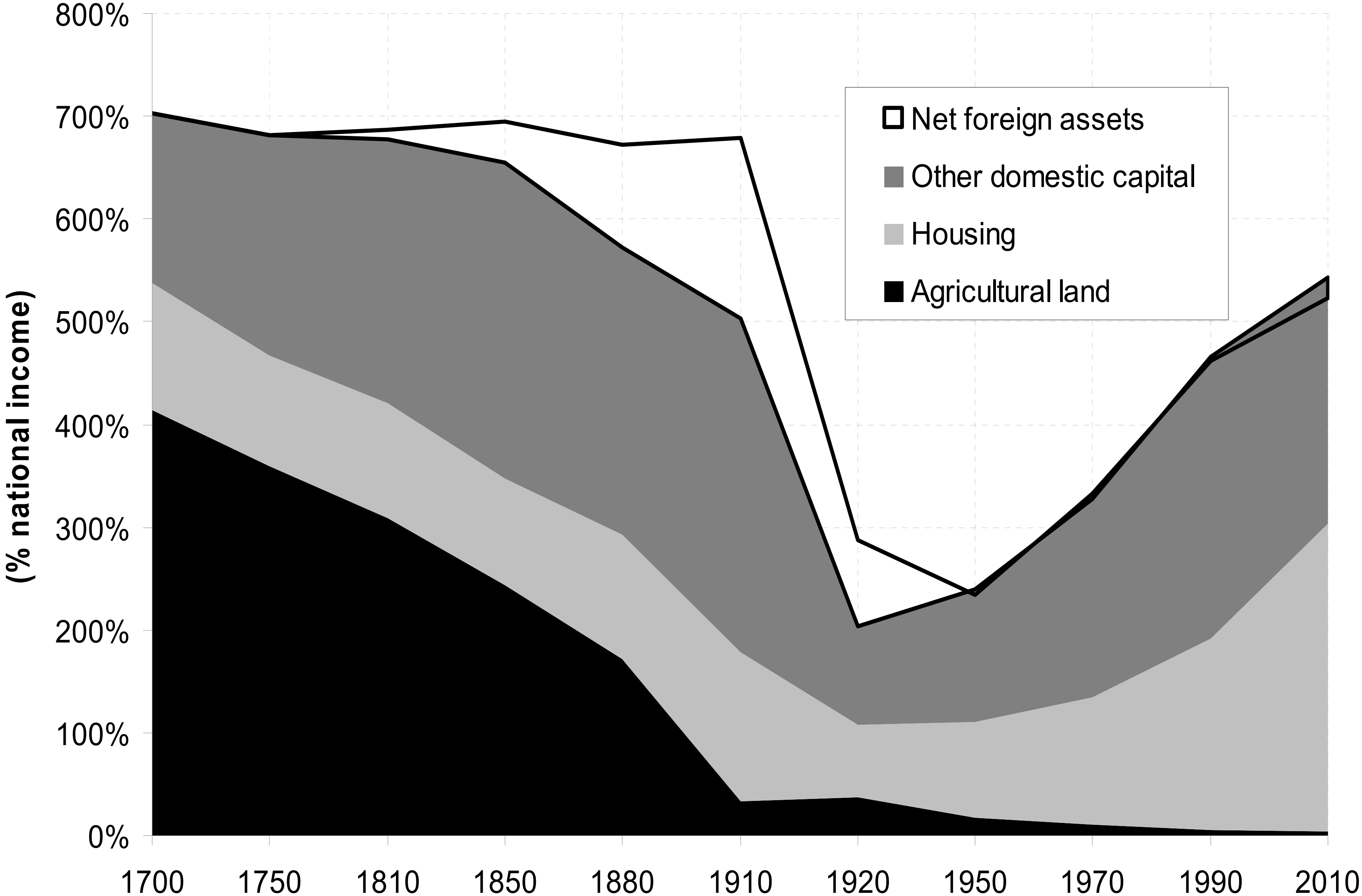
This figure depicts the share of total household wealth relative to national income Source: Piketty, Saez, and Zucman (2018).

Figure 8 ***The rise of private versus the decline of public wealth in rich countries, 1970-2020***



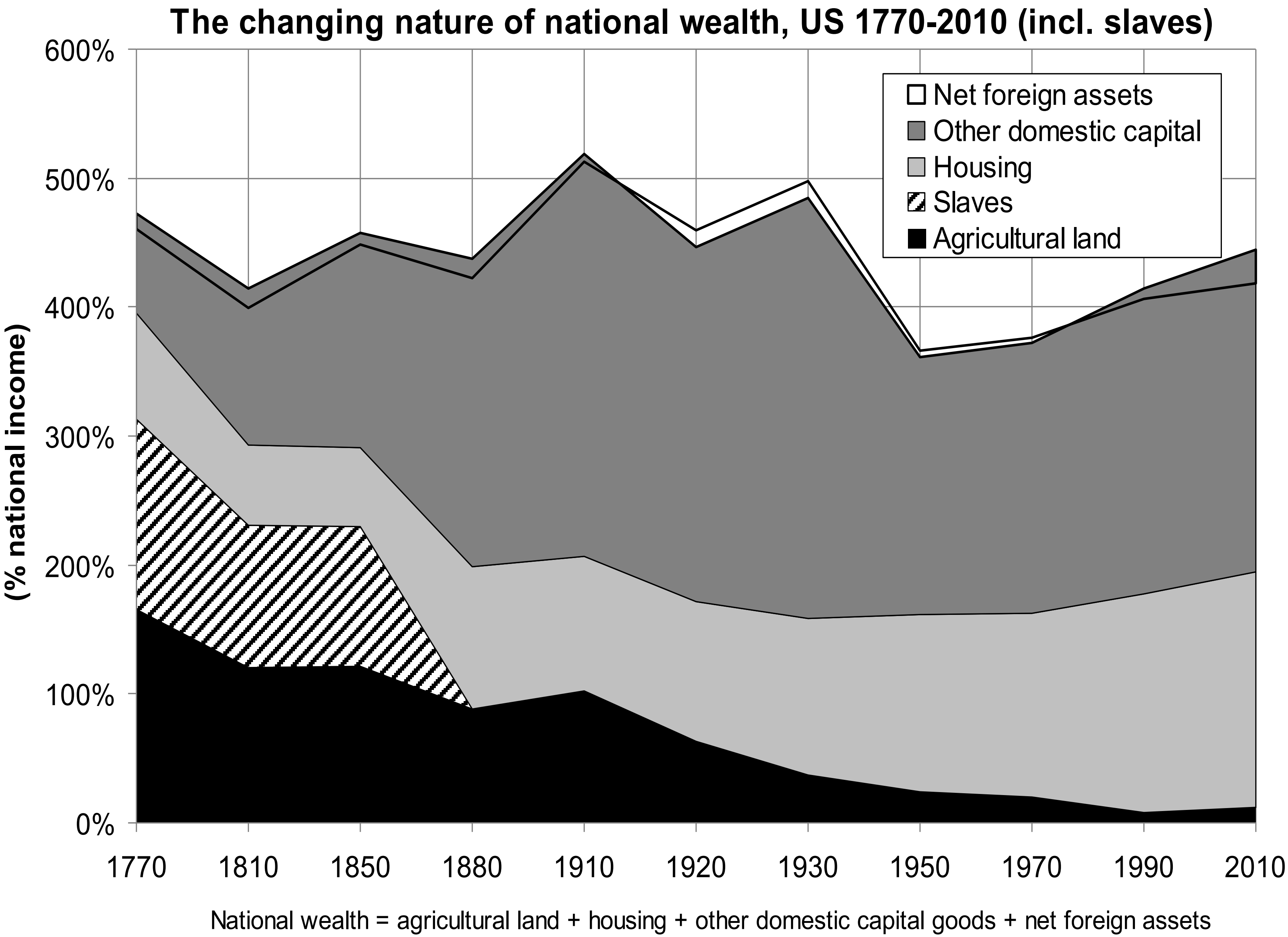
Interpretation: *Public wealth is the sum of all financial and non-financial assets, net of debts, held by governments. Public wealth dropped from 60% of national income in 1970 to -106% in 2020 in the UK.* ***Sources and series:*** *wir2022.wid.world/methodology, Bauluz et al. (2021) and updates.*

The changing nature of national wealth, UK 1700-2010



National wealth = agricultural land + housing + other domestic capital goods + net foreign assets

Source: Piketty, Handbook chapter, 2014



Source: Piketty and Zucman '13

Piketty (2014) book: Capital in the 21st Century

Analyzes income, wealth, inheritance data over the long-run:

1) Growth rate $n+g$ = population growth + growth per capita. Population growth will converge to zero, growth per capita for frontier economies is modest (1%) $\Rightarrow$ long-run $g \simeq 1\%, n \simeq 0\%$

2) Long-run steady-state Wealth to income ratio (β) = savings rate (s) / annual growth ($n+g$): $\beta = s/(n+g)$

Proof: $K_{t+1} = (1+n+g) \cdot K_t = K_t + s \cdot Y_t \Rightarrow K_t/Y_t = s/(n+g)$

With $s = 8\%$ and $n+g = 2\%$, $\beta = 400\%$ but with $s = 8\%$ and $n+g = 1\%$, $\beta = 800\%$ $\Rightarrow$ Wealth will become important

Debate on whether price effects vs. savings effects driving up wealth values (Rognlie 2015)

Piketty (2014) book: Capital in the 21st Century

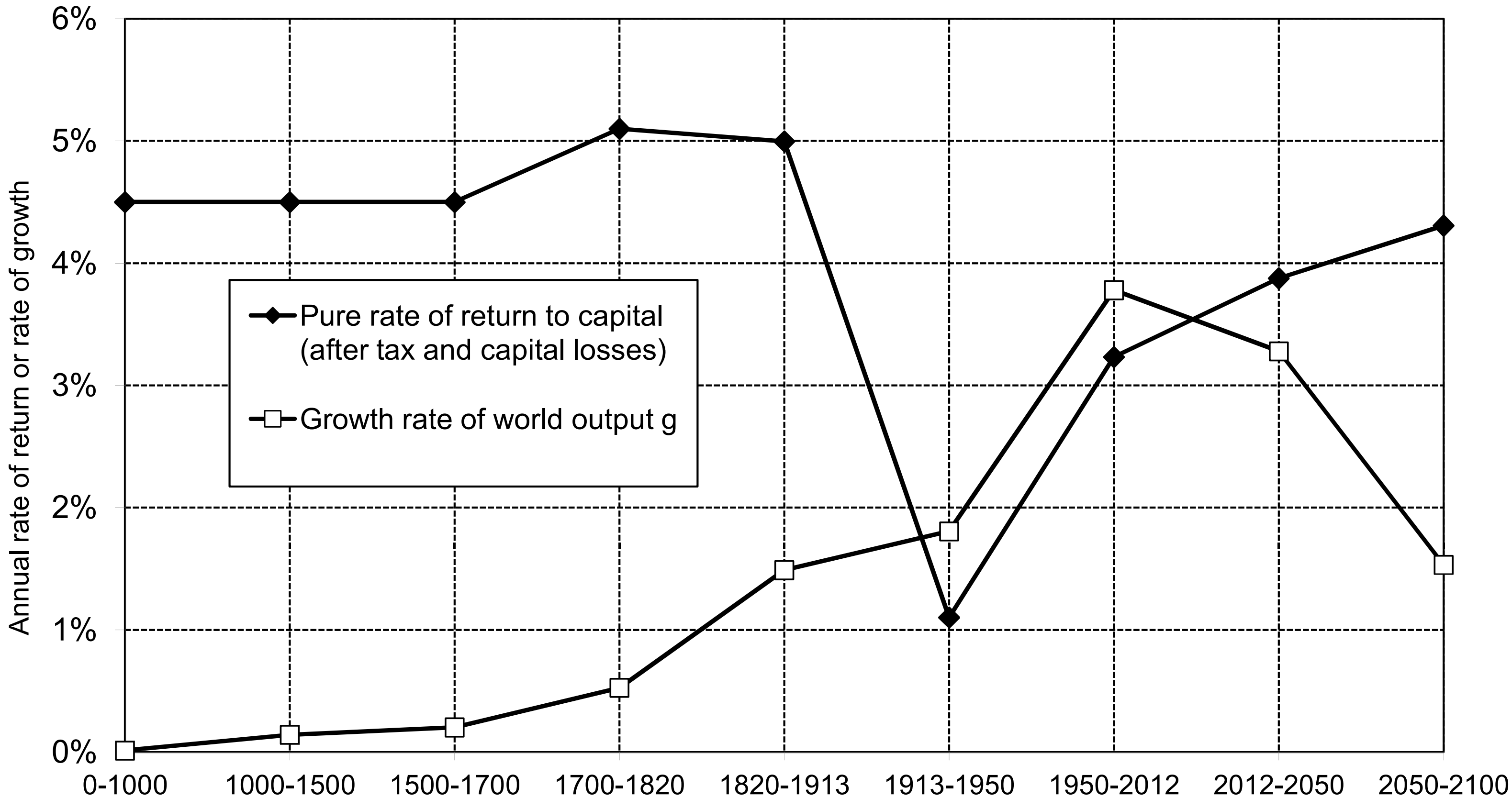
3) After-tax rate of return on wealth $\bar{r} = r(1 - \tau_K) = 4 - 5\%$ significantly larger than $n + g$ [except for period of 1930–1970]

With $\bar{r} > n + g$, role of inheritance in wealth and wealth concentration become large [past swallows the future]

Explanation: Rentier who saves all his return on wealth accumulates wealth at rate $\bar{r}$ bigger than $n + g$ and hence his wealth grows relative to the size of the economy. The bigger $\bar{r} - (n + g)$, the easier it is for wealth to "snowball"

$\Rightarrow$ Capital taxation reduces r to $\bar{r} = r \cdot (1 - \tau_K)$ $\Rightarrow$ This can reduce wealth concentration

Figure 10.10. After tax rate of return vs. growth rate at the world level, from Antiquity until 2100



The rate of return to capital (after tax and capital losses) fell below the growth rate during the 20th century, and may again surpass it in the 21st century. Sources and series : see piketty.pse.ens.fr/capital21c

Source: Piketty (2014)

INDIVIDUAL WEALTH AND CAPITAL INCOME

Wealth $= W$, Income Return $= r$, Capital Income $= rW$, Price appreciation q, Pure capital gain qW. Total return $= r + q$

$$W_t = W_{t-1} + (r_t + q_t) \cdot W_{t-1} + E_t + I_t - C_t$$

where W_t is wealth at age t, C_t is consumption, E_t labor income earnings (net of taxes), $r_t + q_t$ is the average (net) total rate of return on investments and I_t net inheritances (gifts received and bequests minus gifts given).

Replacing W_{t-1} and so on, we obtain the following expression (assuming initial wealth W_0 is zero):

$$W_t = \sum_{k=1}^{t} (E_k - C_k + I_k) \cdot \prod_{j=k+1}^{t} (1 + r_j + q_j)$$

INDIVIDUAL WEALTH AND CAPITAL INCOME

$$W_t = \sum_{k=1}^{t} (E_k - C_k) \cdot \prod_{j=k+1}^{t} (1 + r_j + q_j) + \sum_{k=1}^{t} I_k \cdot \prod_{j=k+1}^{t} (1 + r_j + q_j)$$

1st term is **life-cycle** wealth, 2nd term is **inherited** wealth

Differences in Wealth and Capital income due to:

1) Age

2) Past earnings and saving behavior $E_t - C_t$ [life cycle wealth]

3) Net Inheritances received I_t [transfer wealth]

4) Rates of return on wealth: income r_t and price effects q_t

[details in Davies-Shorrocks '00, Handbook chapter]

Wealth Inequality (Saez and Zucman '16)

Wealth inequality is very large (always much higher than income inequality). Worldwide income and wealth inequality statistics constructed in World Inequality Report '22

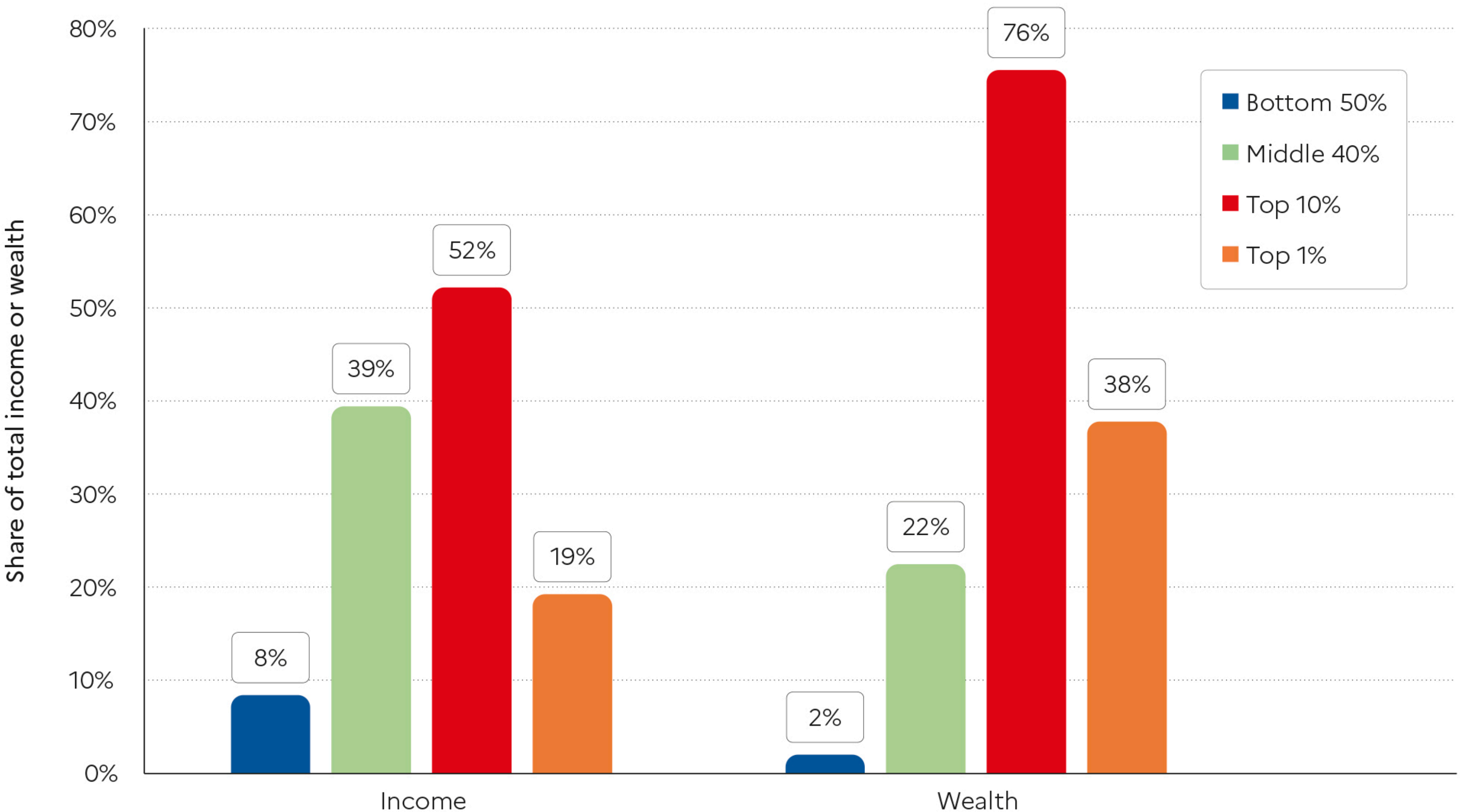
In the US in 2021: Top 1% wealthiest households has 40% of total wealth, Next 9% get about 35%, next 40% get 25%, bottom 50% get about 0%

Wealth inequality **decreases** from 1929 to 1980: wealth democratization due to rise in homeownership and pensions

Wealth inequality increases sharply since 1980 fueled by increases in **income** inequality and **savings** inequality [bottom 90% saves zero in net since 1990]

US public underestimates extent of wealth inequality and thinks the ideal wealth distribution should be a lot more equal [Norton-Ariely '11]

Figure 1.1 ***Global income and wealth inequality, 2021***



Interpretation: *The global 50% captures 8% of total income measured at Purchasing Power Parity (PPP). The global bottom 50% owns 2% of wealth (at Purchasing Power Parity). The global top 10% owns 76% of total Household wealth and captures 52% of total income in 2021. Note that top wealth holders are not necessarily top income holders. Income is measured after the operation of pension and unemployment systems and before taxes and transfers.* **Sources and series:** *wir2022.wid.world/methodology*

Source: Norton and Ariely 2011

Fig. 2. The actual United States wealth distribution plotted against the estimated and ideal distributions across all respondents. Because of their small percentage share of total wealth, both the "4th 20%" value (0.2%) and the "Bottom 20%" value (0.1%) are not visible in the "Actual" distribution.

WEALTH MEASUREMENT

In the US, wealth distribution much less well measured than income distribution because no systematic administrative source (no wealth tax). 4 methods to estimate wealth distribution:

1) Surveys: US Survey of Consumer Finances (SCF)

Uses tax returns data frame to oversample top 1%

Problems: small sample size (3500), measurement error, only every 3 years, starts in 1989, most recent is 2019

Distributional Financial Accounts (web) combine SCF and macro financial accounts to distribute US wealth at quarterly level since 1989 up to present (see Saez and Zucman JEP'20)

Top 10% wealth share grew from 67% in 1989 to 77% in 2019

Top 1% wealth share grew from 28% in 1989 to 38% in 2019

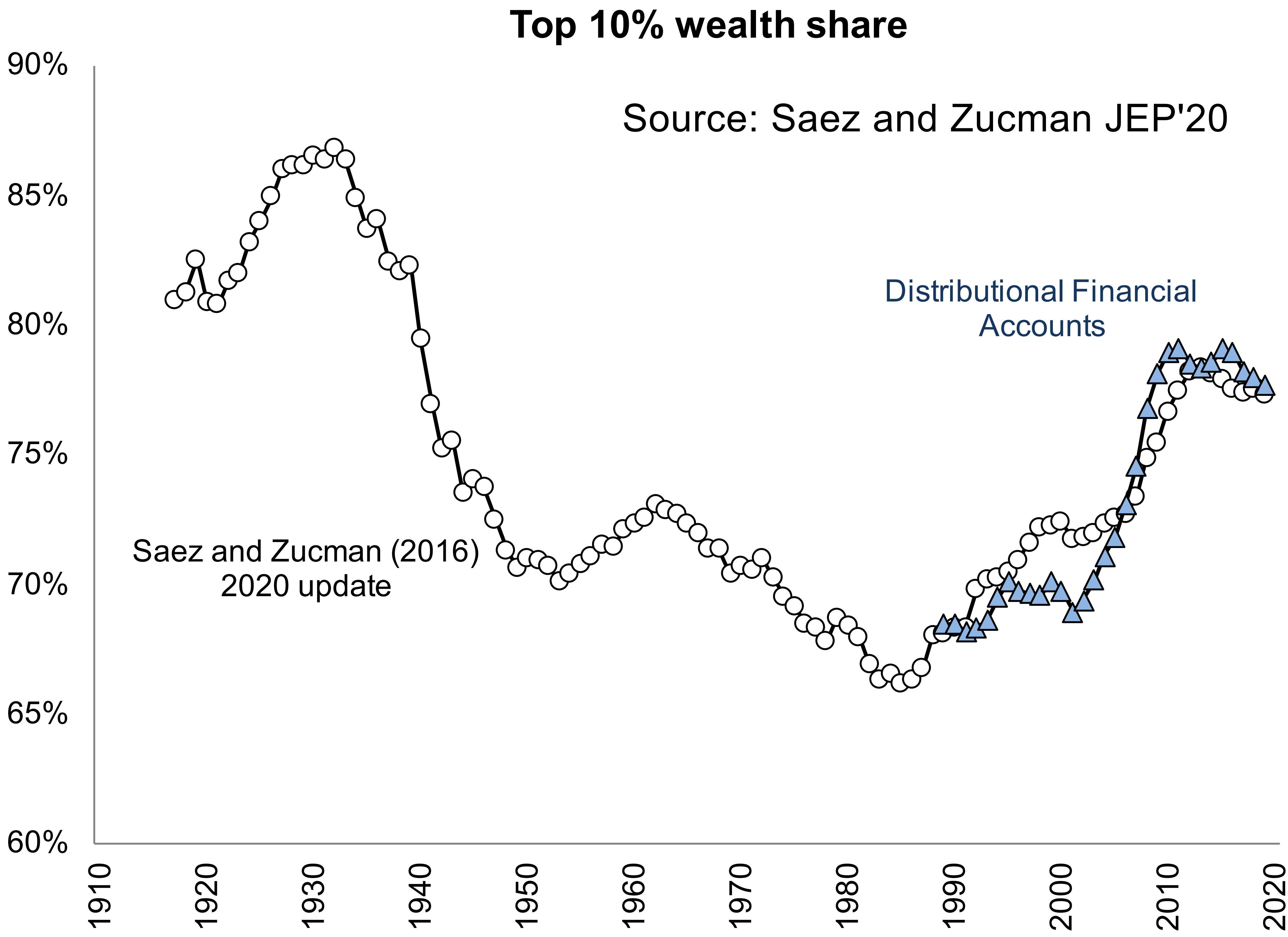
2) Estate multiplier method: use annual estate tax statistics and re-weights individual estates by inverse of death probability [based on age$\times$gender$\times$social class]

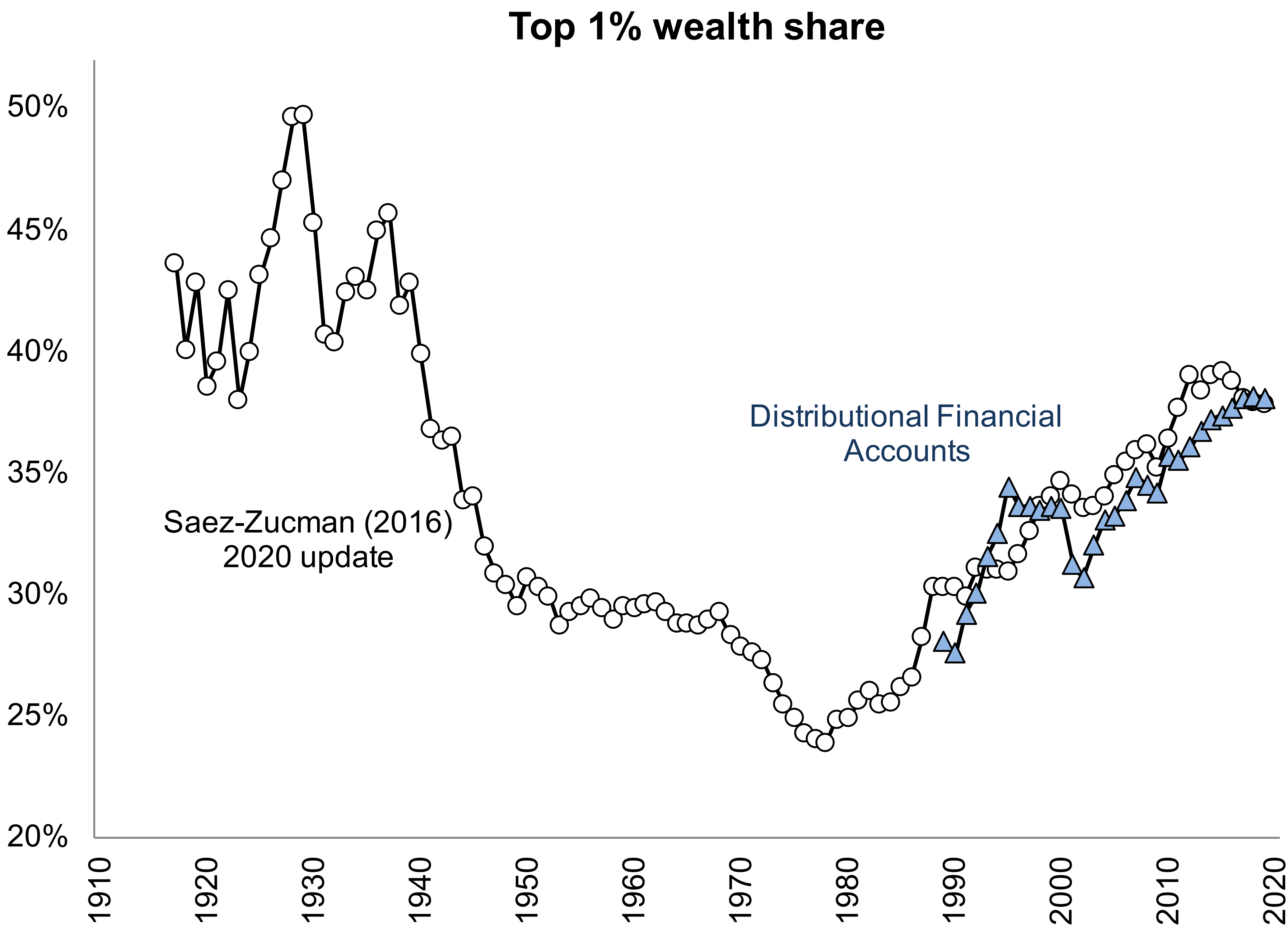
Kopczuk-Saez NTJ'04 create series 1916-2000 and find fairly small increases in wealth concentration in recent decades

Problems: longevity of rich has increased faster than average, significant estate tax avoidance, estates cover only the super rich [see Saez and Zucman 2019b]

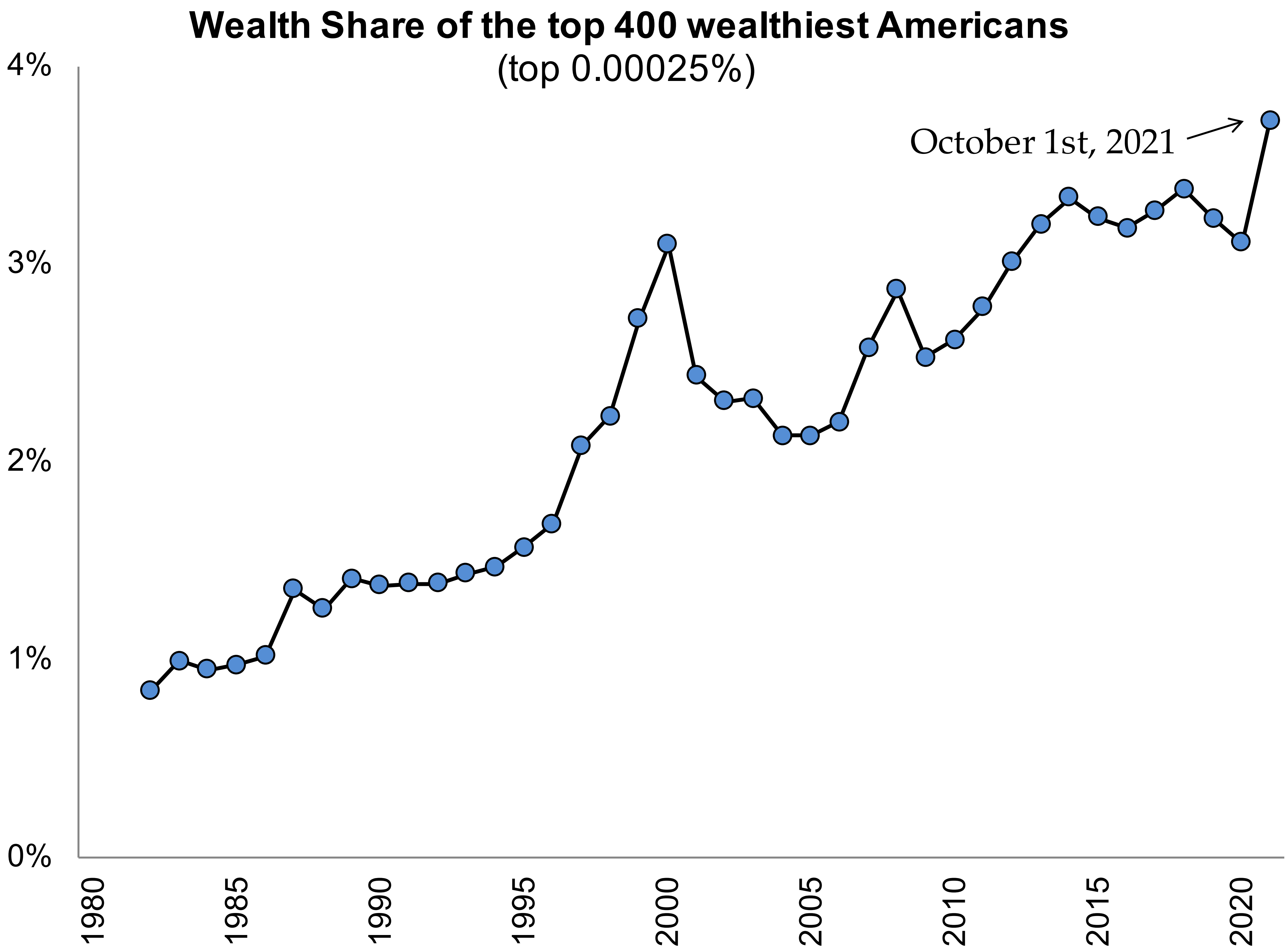
3) Capitalization method: use capital income from individuals tax statistics and estimates rates of returns by asset class to infer wealth: shows big increase in wealth concentration [Saez-Zucman '16]. Real-time in Blanchet-Saez-Zucman '22

4) Rich lists: Forbes and Bloomberg magazines compile lists of US billionaires using public records on publicly traded stock ownership, estimates of private businesses, and diversified portfolios. Used to improve estimates from 1) and 3).

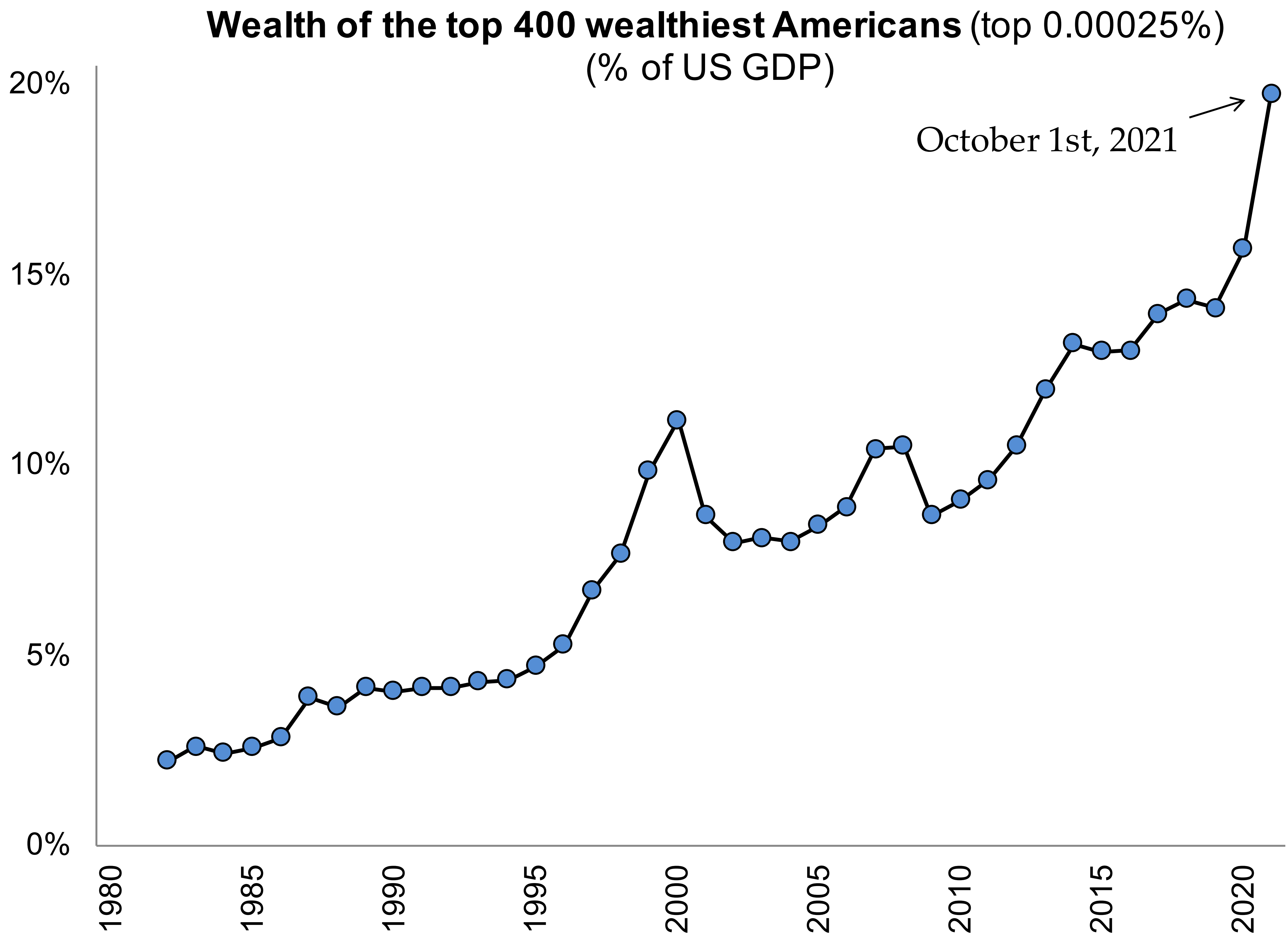

Top 10% wealth share
Source: Saez and Zucman JEP'20
90%
85%
80%
75%
70%
65%
60%
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010
2020
Distributional Financial Accounts
Saez and Zucman (2016) 2020 update



Top 1% wealth share
50%
45%
40%
35%
30%
25%
20%
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010
2020
Distributional Financial Accounts
Saez-Zucman (2016) 2020 update



Wealth Share of the top 400 wealthiest Americans
(top 0.00025%)
October 1st, 2021
4%
3%
2%
1%
0%
1980
1985
1990
1995
2000
2005
2010
2015
2020

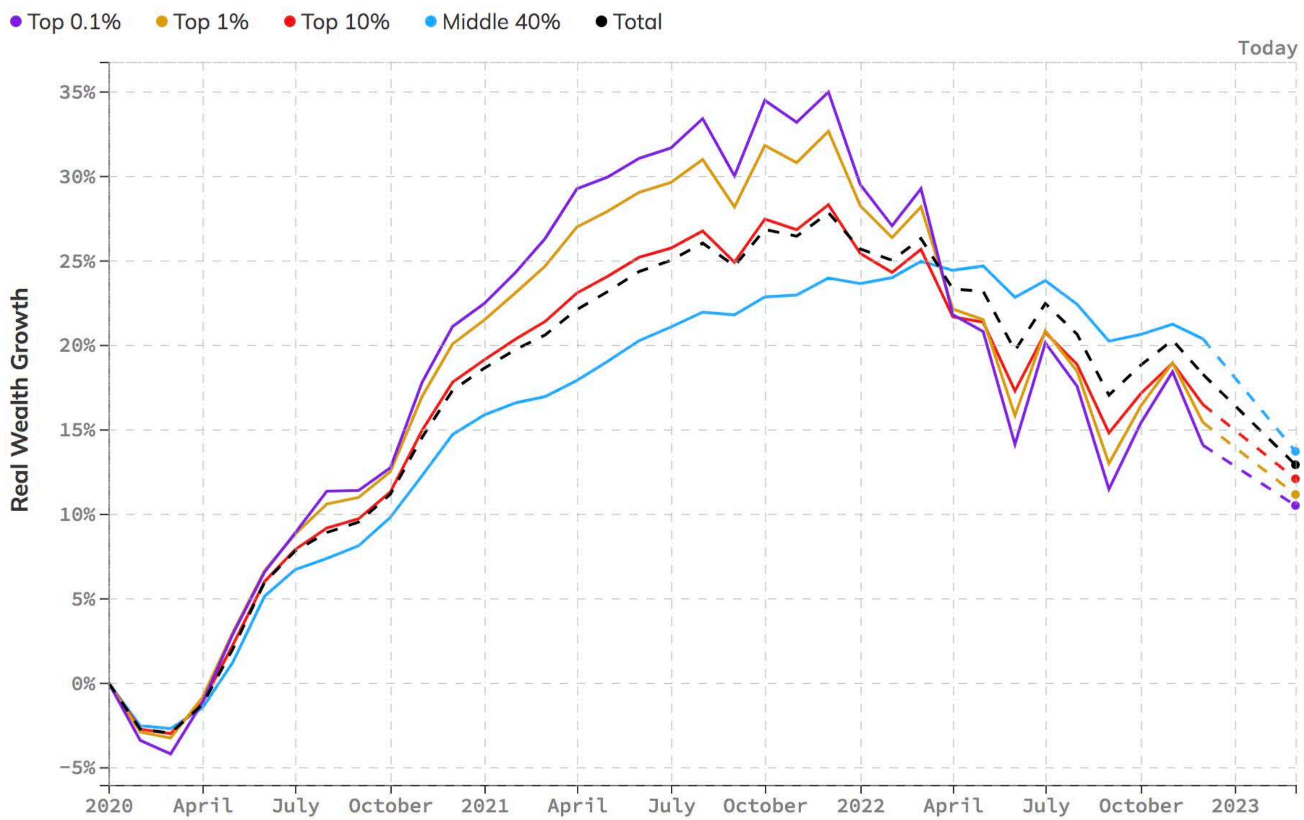


Wealth of the top 400 wealthiest Americans (top 0.00025%)
(% of US GDP)
October 1st, 2021
20%
15%
10%
5%
0%
1980
1985
1990
1995
2000
2005
2010
2015
2020

Wealth graph options Reset

Graph display NEW ◉ Realtime data (projected to current day) ○ Historical data (up to most recent quarter)

Y-AXIS	WEALTH TYPE	POPULATION	DATA FREQUENCY	FROM		
Real Wealth Growth	Wealth	Adults (age 20+)	Monthly		January	2020



Wealth growth per adult

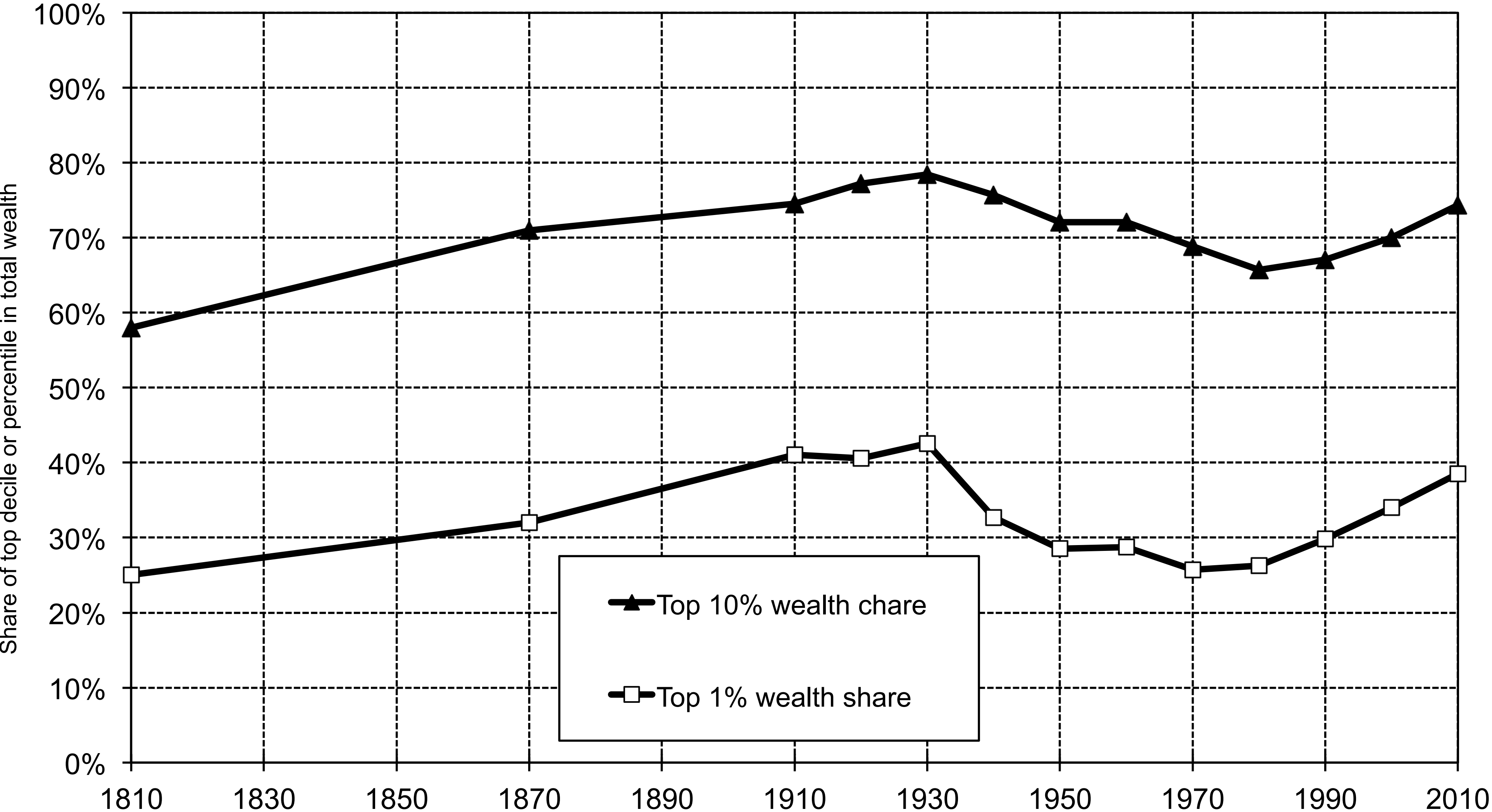
From Jan 2020 to Today

Group	Growth (%)	Gain ($)
☐ Top 0.01%	8.8%	$36M
☑ Top 0.1%	**10.5%**	$8.3M
☑ Top 1%	**11.1%**	$1.7M
☑ Top 10%	**12.1%**	$380k
☑ Middle 40%	**13.7%**	$44k
☐ Bottom 50%	93.3%	$3.7k
☑ Total	**12.9%**	$57k

Mutually Exclusive Groups (Click to expand) +

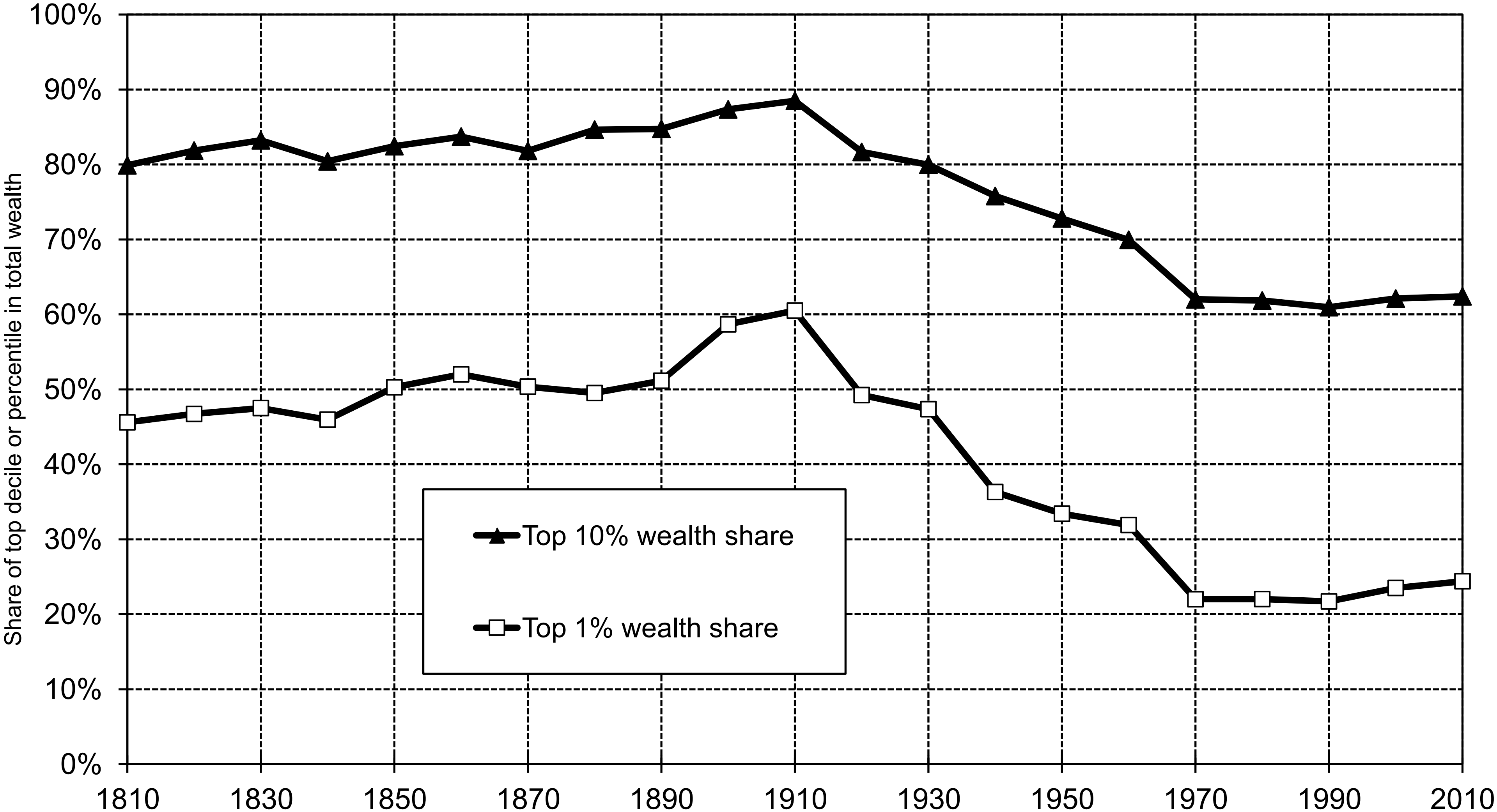
Share Download data

Figure 3.5. Wealth inequality in the U.S., 1810-2010



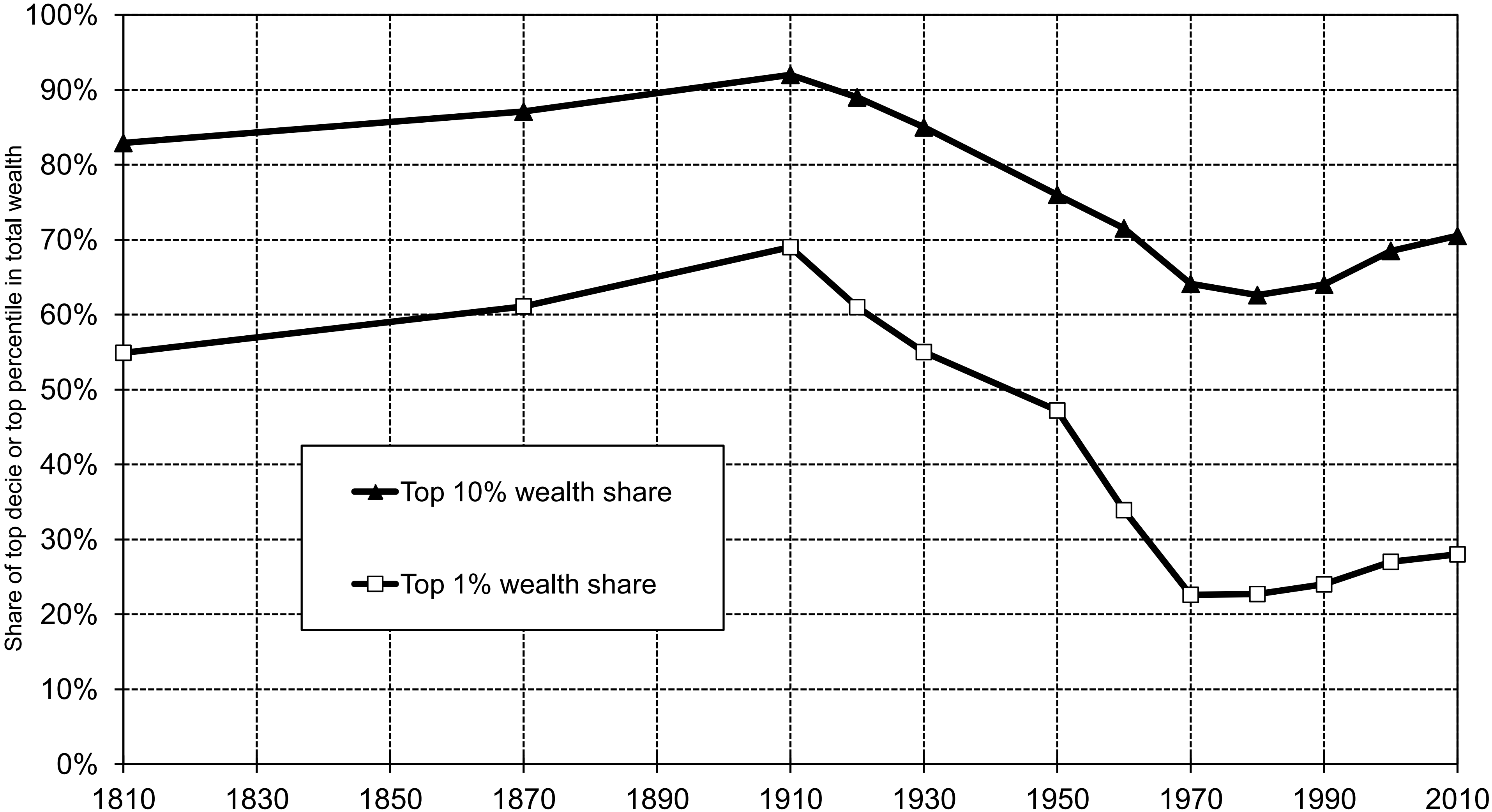
The top 10% wealth holders own about 80% of total wealth in 1929, and 75% today.

Figure 3.1. Wealth inequality in France, 1810-2010



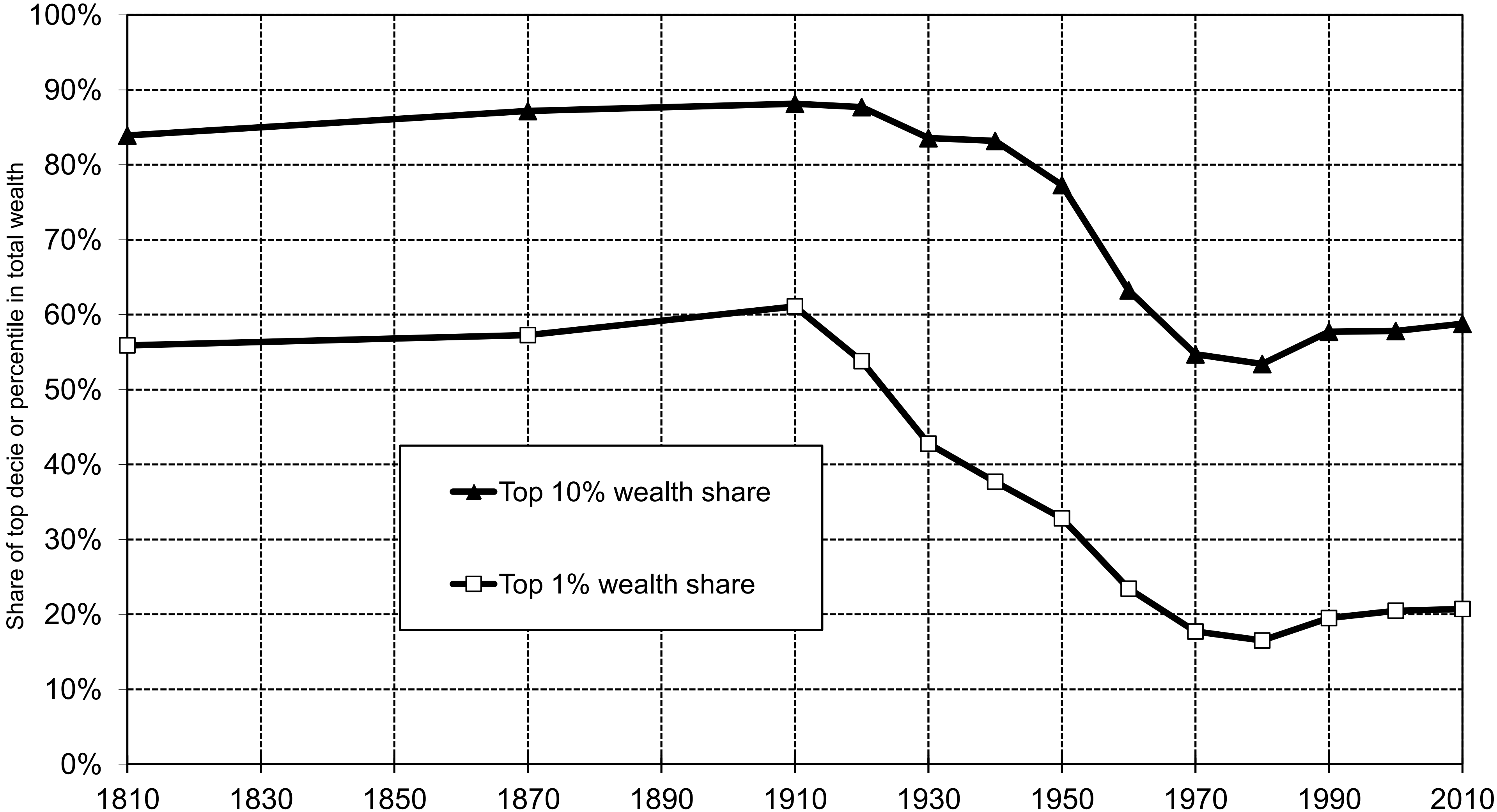
The top decile (the top 10% highest wealth holders) owns 80-90% of total wealth in 1810-1910, and 60-65% today.

Figure 3.3. Wealth inequality in the United Kingom, 1810-2010



The top decile owns 80-90% of total wealth in 1810-1910, and 70% today.

Figure 3.4. Wealth inequality in Sweden, 1810-2010



The top 10% holds 80-90% of total wealth in 1810-1910, and 55-60% today.

LIFE CYCLE VS. INHERITED WEALTH

Old view: Tobin and Modigliani: life cycle wealth accounts for the bulk of the wealth held in the US. Kotlikoff-Summers JPE'81 challenged the old view (debate Kotlikoff vs. Modigliani in JEP'88)

Why is this question important?

1) Economic Modeling: what accounts for wealth accumulation and inequality? Is widely used life-cycle model with no bequests a good approximation?

2) Policy Implications: taxation of capital income and estates. Role of pay-as-you-go vs. funded retirement programs

Key problem is that the definition of life-cycle vs. inherited wealth is not conceptually clean (Modigliani does not capitalize inherited wealth while Kotlikoff-Summers do)

LIFE CYCLE VS. INHERITED WEALTH

Piketty-Postel-Vinay-Rosenthal EEH'14 (PPVR) propose better definition to resolve Modigliani vs. Kotlikoff-Summers controversy (see Piketty-Zucman Handbook chapter '14)

Individual wealth accumulation (using $R = r + q$ total return):

$$W_t = \sum_{k=1}^{t} (E_k - C_k) \cdot (1+R)^{t-k} + \sum_{k=1}^{t} I_k \cdot (1+R)^{t-k}$$

If $W_t > \sum_{k=1}^{t} I_k \cdot (1+R)^{t-k}$ then individual also saves out of labor income E_k and inherited wealth is $\sum_{k=1}^{t} I_k \cdot (1+R)^{t-k}$

If $W_t \leq \sum_{k=1}^{t} I_k \cdot (1+R)^{t-k}$ then individual has consumed part of inheritances (in addition to labor income) and inherited wealth is W_t

PPVR requires micro-data for implementation. If we assume uniform saving rate s, there is a simplified formula for share of inherited wealth $b_y/[b_y + (1-\alpha) \cdot s]$ with b_y bequest flow/national income and α capital share

LIFE CYCLE VS. INHERITED WEALTH

How do the shares of inheritance vs. life-cycle evolve over time? First measure is inheritance flow to national income

Inheritance share likely huge in the distant past: class society with landowners vs. workers [Delong '03]

Inheritance share $\downarrow$ in 20th century but has $\uparrow$ recently in France (Piketty QJE'11, Piketty-Zucman '14 handbook chapter)

Post-war period was a time of fast population and economic growth $\Rightarrow$ If $n + g$ (growth) large relative to r (rate of return on wealth) $\Rightarrow$ Inheritances play minor role in life-time wealth

In general $r > n + g$ in which case inheritances play a large role in aggregate wealth and wealth concentration is going back (Western countries moving in that direction, Piketty '14)

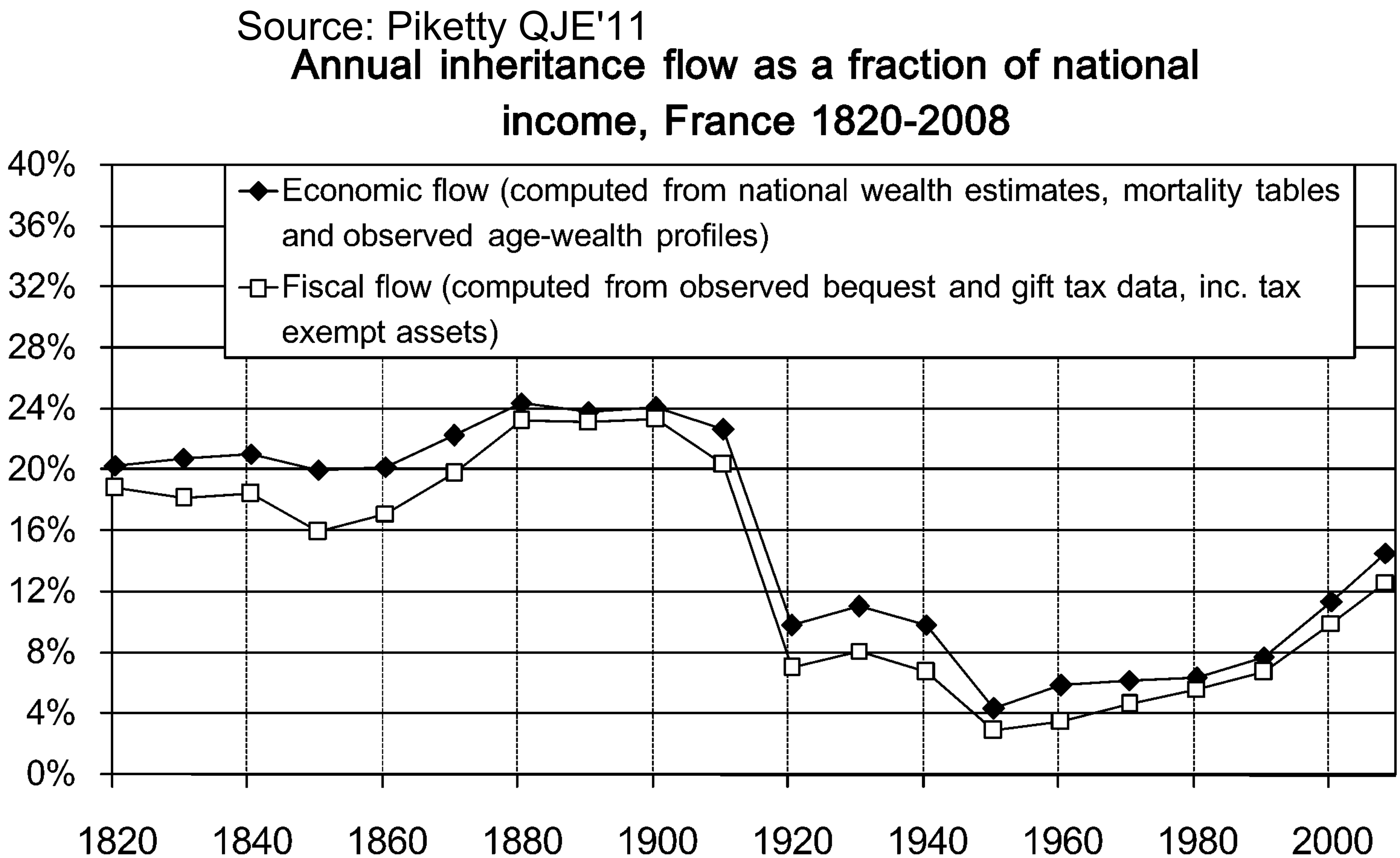


FIGURE I

Annual Inheritance Flow as a Fraction of National Income, France, 1820–2008

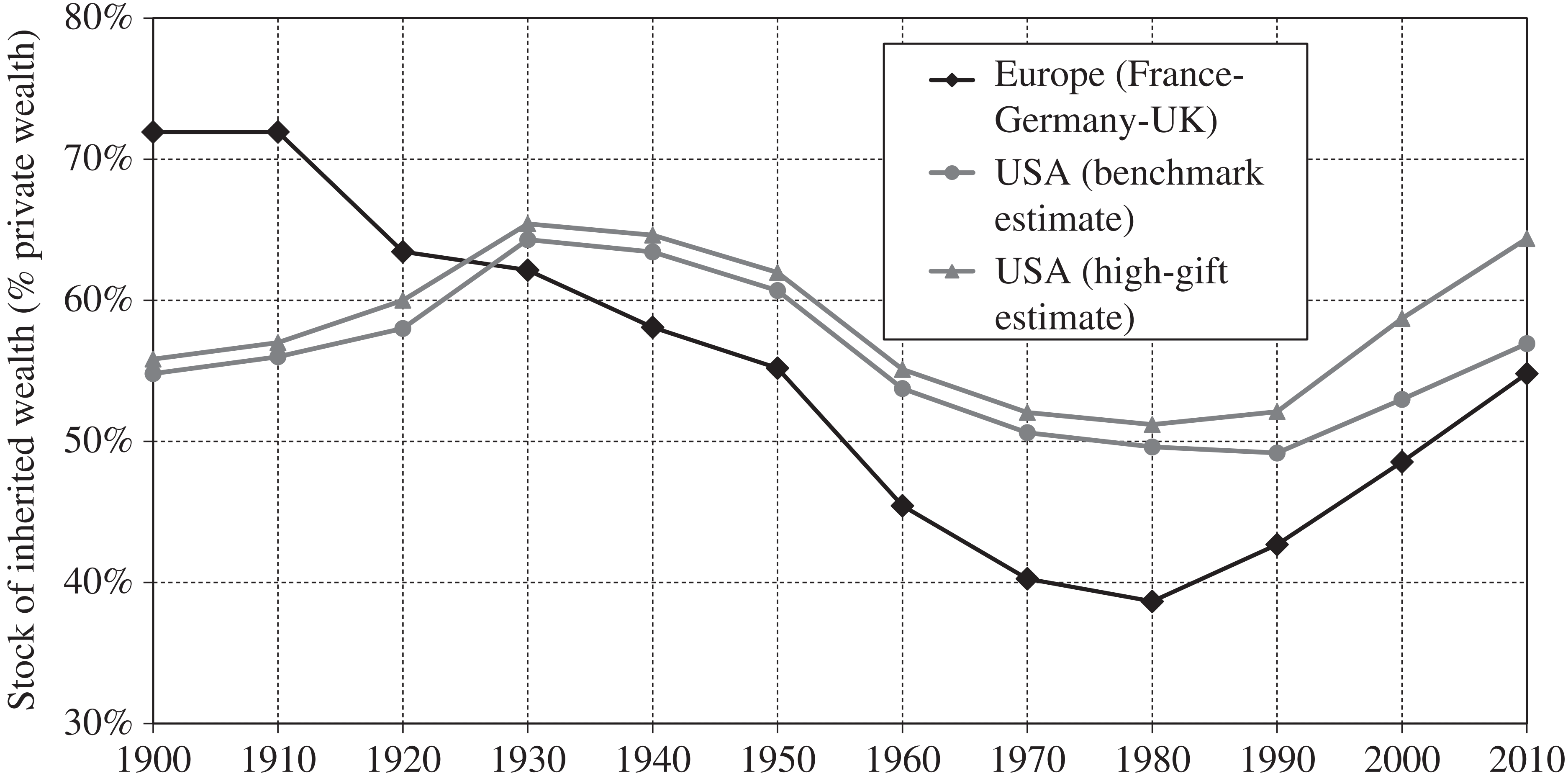


FIGURE 1. Share of inherited wealth, Europe and the USA 1900–2010.
Notes: Simplified definitions using inheritance vs. saving flows; approximate lower-bound estimates. The inheritance share in aggregate wealth accumulation was over 70% in Europe in 1900–10. It fell abruptly following 1914–45 shocks, down to 40% in the 1970–80 period. It was back to about 50–60% (and rising) in 2000–10. The US pattern also appears to be U-shaped but less marked, and with significant uncertainty regarding recent trends, due to data limitations.

Source: Alveredo-Garbinti-Piketty '17

CAPITAL TAXATION IN THE US

Four main capital taxes in US (and most OECD countries):

1) **Corporate Income Tax** (fed+state): 21% Federal tax rate on profits of corporations [complex rules with many industry specific provisions]: effective tax rate much lower and incidence depends on mobility of capital bc tax is source based

2) **Individual Income Tax** (fed+state): taxes many forms of capital income. Tax is based on owners' residence (generally on worldwide capital income of the person)

Realized capital gains and dividends receive preferential treatment (to alleviate double corporation+individual tax)

Imputed rent of homeowners, returns on pension funds, state+local government bonds interest are exempt

FACTS OF US CAPITAL INCOME TAXATION

3) **Estate and gift taxes:**

Fed taxes estates above \$13M exemption (only .1% of deceased liable), tax rate is 40% above exemption (2013+)

Charitable and spousal giving are exempt

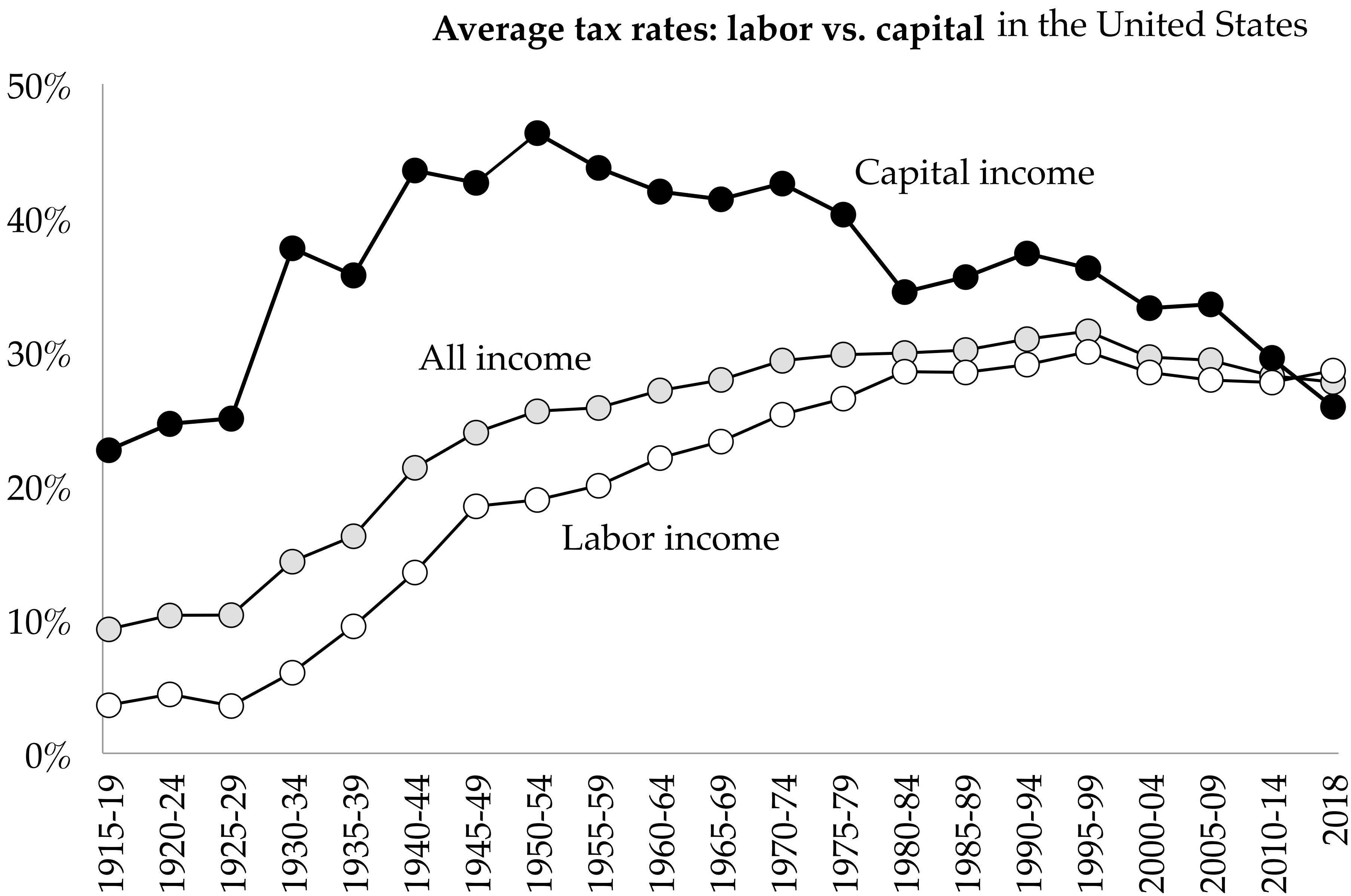
Substantial tax avoidance activity through tax accountants

Step-up of realized capital gains at death (lock-in effect)

4) **Property taxes** (local) on real estate (old tax):

Tax varies across jurisdictions. About 0.5% of market value on average, like a 10% tax on imputed rent if return is 5%

5) **Progressive Wealth tax**: debated in the US, exists in some countries



Source: Saez and Zucman (2019)

TAXES IN OLG LIFE-CYCLE MODEL

Life-time utility: $U = u(c_1, l_1) + \delta \cdot u(c_2, l_2)$

No tax situation: earn $w_1 l_1$ in period 1, $w_2 l_2$ in period 2

Savings $s = w_1 l_1 - c_1$, $c_2 = w_2 l_2 + (1+r)s$

Capital income $r \cdot s$

Intertemporal budget with no taxes:

$$c_1 + c_2/(1+r) = w_1 l_1 + w_2 l_2/(1+r)$$

Period 2 consumption or earnings are discounted with price $1/(1+r)$ relative to period 1

This model has uniform rate of return and does not capture excess returns

TAXES IN OLG MODEL

Budget with consumption tax t_c:

$$(1 + t_c)[c_1 + c_2/(1 + r)] = w_1 l_1 + w_2 l_2/(1 + r)$$

Budget with labor income tax τ_L:

$$c_1 + c_2/(1 + r) = (1 - \tau_L)[w_1 l_1 + w_2 l_2/(1 + r)]$$

Consumption and labor income tax are equivalent if

$$1 + t_c = 1/(1 - \tau_L)$$

Both taxes distort only labor-leisure choice

But timing of taxes paid differ: you pay when you earn with labor tax, you pay when you consume with consumption tax

TAXES IN OLG MODEL

Budget with capital income tax τ_K:

$$c_1 + c_2/(1 + r(1 - \tau_K)) = w_1 l_1 + w_2 l_1/(1 + r(1 - \tau_K))$$

τ_K distorts the price of period 2 and hence the inter-temporal consumption choice (not labor-leisure choice within period)

Budget with comprehensive income tax τ:

$$c_1 + c_2/(1 + r(1 - \tau)) = (1 - \tau)[w_1 l_1 + w_2 l_2/(1 + r(1 - \tau))]$$

τ distorts both labor-leisure and inter-temporal consumption choices

τ imposes "double" tax: (1) on earnings, (2) on returns to savings

EFFECT OF r ON SAVINGS (skip)

Assume that labor supply is fixed. Draw graph. Suppose $r \uparrow$:

1) Substitution effect: price of $c_2 \downarrow \Rightarrow c_2 \uparrow$, $c_1 \downarrow \Rightarrow$ savings $s = w_1 l_1 - c_1 \uparrow$.

2) Wealth effect: Price of $c_2 \downarrow \Rightarrow$ both c_1 and $c_2 \uparrow \Rightarrow$ save less

3) Human wealth effect: present discounted value of labor income $\downarrow \Rightarrow$ both c_1 and $c_2 \downarrow \Rightarrow$ save more

Note: If $w_2 l_2 < c_2$ (ie $s > 0$), 2)+3) $\Rightarrow$ save less

Total net effect is theoretically ambiguous $\Rightarrow \tau_K$ has ambiguous effects on s

SHIFT FROM LABOR TO CONSUMPTION TAX (skip)

Labor and consumption are equivalent for the individual if $1 + t_c = 1/(1 - \tau_L)$ but savings pattern is different

Assume $w_2 = 0$ and $l_1 = 1$

$(1 + t_c)[c_1 + c_2/(1 + r)] = w_1$ with consumption tax

$c_1 + c_2/(1 + r) = (1 - t_L)w_1$ with labor tax

1) Consumption tax t_c: $c_1^c = (w_1 - s_c)/(1 + t_c)$, $c_2^c = (1 + r)s_c/(1 + t_c)$

2) Labor income tax τ_L: $c_1^L = w_1(1 - \tau_L) - s_L$, $c_2^L = (1 + r)s_L$

Same consumption in both cases so $s_L = s_c/(1 + t_c) \Rightarrow$ Save more with a consumption tax

TRANSITION FROM LABOR TO C TAX (skip)

In OLG model and closed economy, capital stock is due to life-cycle savings s

Start with labor tax τ_L and switch to a consumption tax t_c

The old [at time of transition] would have paid nothing in labor tax regime but now have to pay tax on c_2

For the young [and future generations], the two regimes look equivalent so they now save more and increase the capital stock

However, this increase in capital stock comes at the price of hurting the old who are taxed twice

TRANSITION FROM LABOR TO C TAX (skip)

Suppose the government keeps the old as well off as in previous system by exempting them from consumption tax

This creates a deficit in government budget equal to

$$d = \tau_L w_1 - t_c c_1 = t_c w_1/(1+t_c) - t_c c_1 = t_c s_L$$

Extra saving by the young is $s_c - s_L = t_c s_L$ exactly equal to government deficit.

Full neutrality result: Extra savings of young is equal to old capital stock + new government deficit $\Rightarrow$ no change in the aggregate capital stock

Full neutrality depends crucially on same r for govt debt and aggregate r [in practice: equity premium puzzle]

[Same result for Social Security privatization]

OPTIMAL CAPITAL INCOME TAXATION

Complex problem with many sub-literatures: Banks and Diamond Mirrlees Review '09, Stantcheva '20, Piketty-Saez-Zucman '23 provide surveys.

1) Life-cycle models [linear and non-linear earnings tax]

2) Models with bequests [many models including the infinite horizon model]

3) Models with future earnings uncertainty: New Dynamic Public Finance [Kocherlakota '09 book]

Bigger gap between theory and policy practice than in the case of static labor income taxation

Life-Cycle model: Atkinson-Stiglitz JpubE '76

Heterogeneous individuals and government uses nonlinear tax on earnings. Should the govt also use tax on savings?

$$V^h = \max U^h(v(c_1, c_2), l) \text{ st } c_1 + c_2/(1 + r(1 - \tau_K)) = wl - T_L(wl)$$

If utility is weakly separable and $v(c_1, c_2)$ is the same for all individuals, then the government should use only labor income tax and should not use tax on savings

Recent proof by Laroque EJ '05 or Kaplow JpubE '06.

Tax on savings justified if:

(1) High skill people have higher taste for saving (e.g, high skill people have lower discount rate) [Saez, JpubE '02]

(2) c_2 is complementary with leisure

Life-cycle model: linear labor income tax

Suppose the government can only use linear earnings tax: $wl \cdot (1 - \tau_L) + E$ instead of nonlinear tax $wl - T(wl)$

If sub-utility $v(c_1, c_2)$ is also homothetic of degree one [i.e., $v(\lambda c_1, \lambda c_2) = \lambda v(c_1, c_2)$ for all λ] then $\tau_K = 0$ is again optimal [linear tax counter-part of Atkinson-Stiglitz, see Deaton, 1979]

In the general case $V^h(c_1, c_2, l)$, optimal τ_K is not always zero

Old literature considered the Ramsey one-person model of linear taxation and expressed optimal τ_K as a function of compensated price and cross-price elastiticities [Corlett-Hague REstud'54, King, 1980, and Atkinson-Sandmo EJ'80]

LIMITS OF LIFE-CYCLE MODEL

Atkinson-Stiglitz shows that life-time savings should not be taxed, tax only labor income

From justice view: seems fair to not discriminate against savers if labor earnings is the only source of inequality and is taxed non-linearly

In reality, capital income inequality also due

(1) difference in rates of returns

(2) shifting of labor income into capital income

(3) inheritances

(1) is not relevant if individuals handle risky assets rationally (as in CAPM model), probably not a very good assumption $\Rightarrow$ Tax on lucky returns might be desirable

Difference in Rates of Returns Across Individuals

Total rate of return on wealth varies significantly over time and across individuals

Example: stock market can gain 30% in some years or lose 20% in others

Specific stocks can increase much faster for successful start-ups (Google) or collapse entirely for bankrupt firms (Enron)

In general, richer individuals are able to invest in higher return assets due to ability to take risks and scale effects in financial advice [e.g., large University endowments get a larger return than smaller ones, Piketty 2014, Chapter 12]

$\Rightarrow$ Taxing capital income is a way to mitigate such inequality

SHIFTING OF LABOR / CAPITAL INCOME

In practice, difficult to distinguish between capital and labor income [e.g., small business profits, professional traders]

Differential tax treatment can induce shifting:

(1) US C-corporations vs S-corporations: shift from corporate income (and subsequent realized capital gains) toward individual business income [Gordon and Slemrod '00]

(2) Carried interest in the US: hedge fund and private equity fund managers receive fraction of profits of assets they manage for clients. Those profits are really labor income but are taxed as realized capital gains

(3) Finnish Dual income tax system: taxes separately capital income at preferred rates since 1993: Pirttila and Selin SJE'11 show that it induced shifting from labor to capital income especially among self-employed

Theory: Shifting of Labor / Capital Income

Extreme case where government cannot distinguish at all between labor and capital income $\Rightarrow$ Govt observes only $wl + rK$ $\Rightarrow$ Only option is to have identical MTRs at individual level $\Rightarrow$ General income tax $Tax = T(wl + rK)$

With a finite shifting elasticity, differential MTRs for labor and capital income taxation induce an additional shifting distortion

The higher the shifting elasticity, the closer the tax rates on labor and capital income should be [Christiansen and Tuomala ITAX'08, see also Piketty-Saez Handbook chapter '13]

In practice, this seems to be a very important consideration when designing income tax systems [especially for top incomes] $\Rightarrow$ Strong reason for having $\tau_L = \tau_K$ at the top

Taxation of Inheritances: Welfare Effects

Def: donor is the person giving, donee is the person receiving

Inheritances and inter-vivos transfers raise difficult issues:

(1) Inequality in inheritances contributes to economic inequality: seems fair to redistribute from those who received inheritances to those who did not

(2) However, it seems unfair to double tax the donors who worked hard to pass on wealth to children

$\Rightarrow$ Double welfare effect: inheritance tax hurts donor (if donor altruistic) and donee (which receives less) [Kaplow, '01]

Estate Taxation in the United States

Estate federal tax imposes a tax on estates above \$13M exemption (only about .1% of deceased liable), tax rate is 40% above exemption (2013+)

Charitable and spousal giving are fully exempt from the tax

E.g.: if Bill Gates / Warren Buffet give all their wealth to charity, they won't pay estate tax

Support for estate tax is pretty weak ("death tax") but public does not know that estate tax affects only richest

Support for estate tax increase shots up from 17% to 53% when survey respondents are informed that only richest pay it (Kuziemko-Norton-Saez-Stantcheva '13 do an online Mturk survey experiment)

Treatment example: Information about the Estate Tax

Besides the income tax, the government can also level the playing field with **the federal estate tax.**

The **Federal Estate Tax** (also known as the **Death Tax**) applies when a deceased person leaves **more than $5 million** in wealth to his or her heirs. Wealth left to a spouse or charitable organizations is exempt from estate tax.

Only 1 person out of 1000 is wealthy enough to face the estate tax.

Average Americans do not have anything close to $5 million in wealth, so the estate tax does not affect them and they can pass on their property to their children tax-free.

Eliminating the estate tax would allow the very richest families to pass down all of their wealth to their children tax-free. Hence, children of rich people would also start off very rich themselves.

Increasing the estate tax is a way to level the playing field between the children of wealthy parents and children of middle-class parents.

Taxation of Inheritances: Behavioral Responses

Potential behavioral response effects of inheritance tax:

(1) reduces wealth accumulation of altruistic donors (and hence tax base) [modest effects: Kopczuk-Slemrod 2001 survey, best recent evidence is Goupille-Infante '18 using french reform on tax treatment of savings]

(2) induces donees to work more through income effects (Carnegie effect, decent evidence from Holtz-Eakin,Joulfaian,Rosen QJE'93)

Critical to understand why there are inheritances to decide on optimal inheritance tax policy. 4 main models of bequests: (a) accidental, (b) bequests in the utility, (c) manipulative bequest motive, (d) dynastic

Inheritance tax and wealth accumulation

France has a tax preferred savings vehicle (like US IRA) with unlimited contributions "Assurance vie" with reform in 1992:

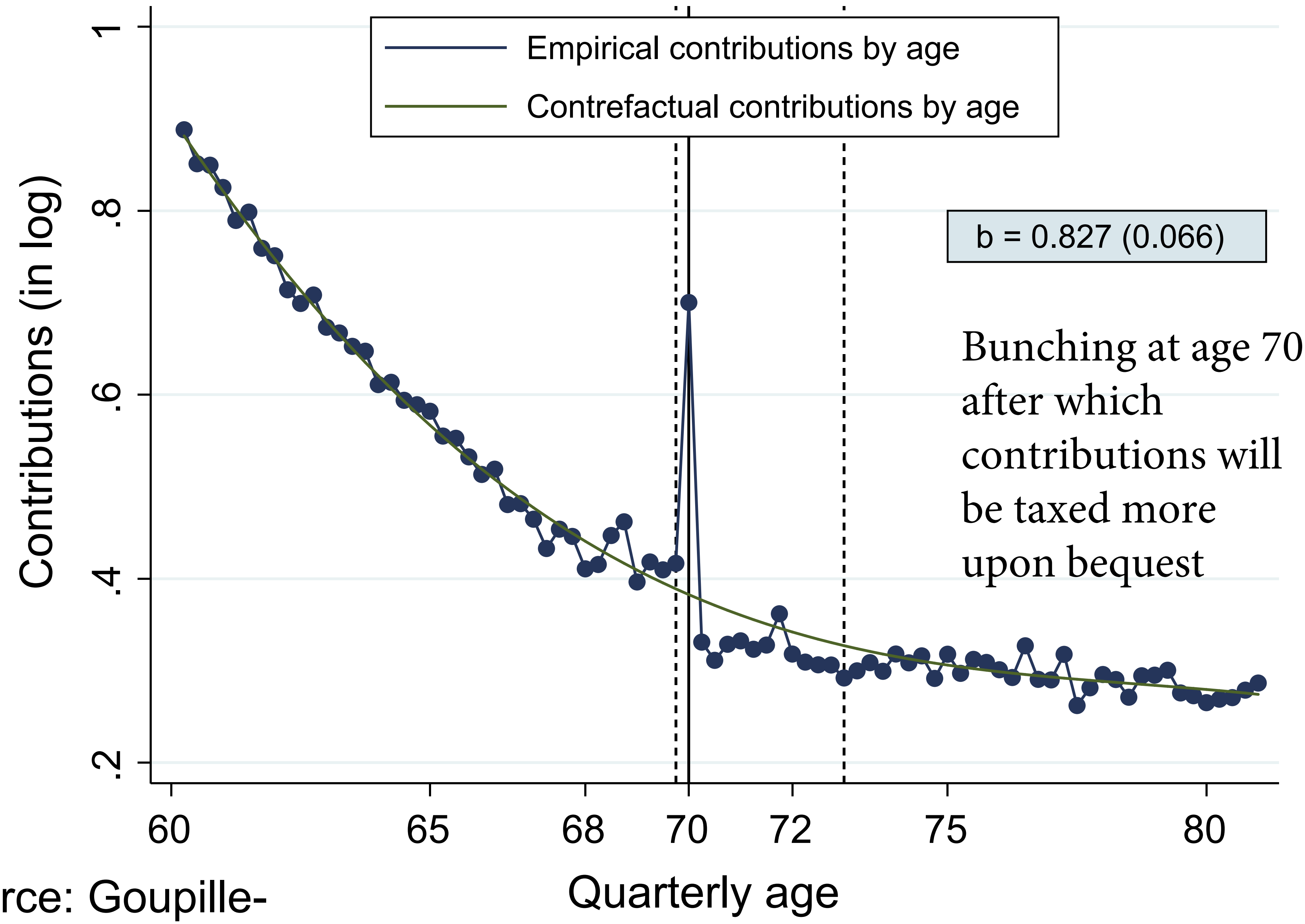
Control: Accounts opened before 11/1991: only 20% tax when bequeathed

Treatment: Accounts opened after 11/1991: contributions after age 70 face higher 40% inheritance tax when bequeathed

Goupille-Infante JpubE'18 uses AXA bank data for 2003-13:

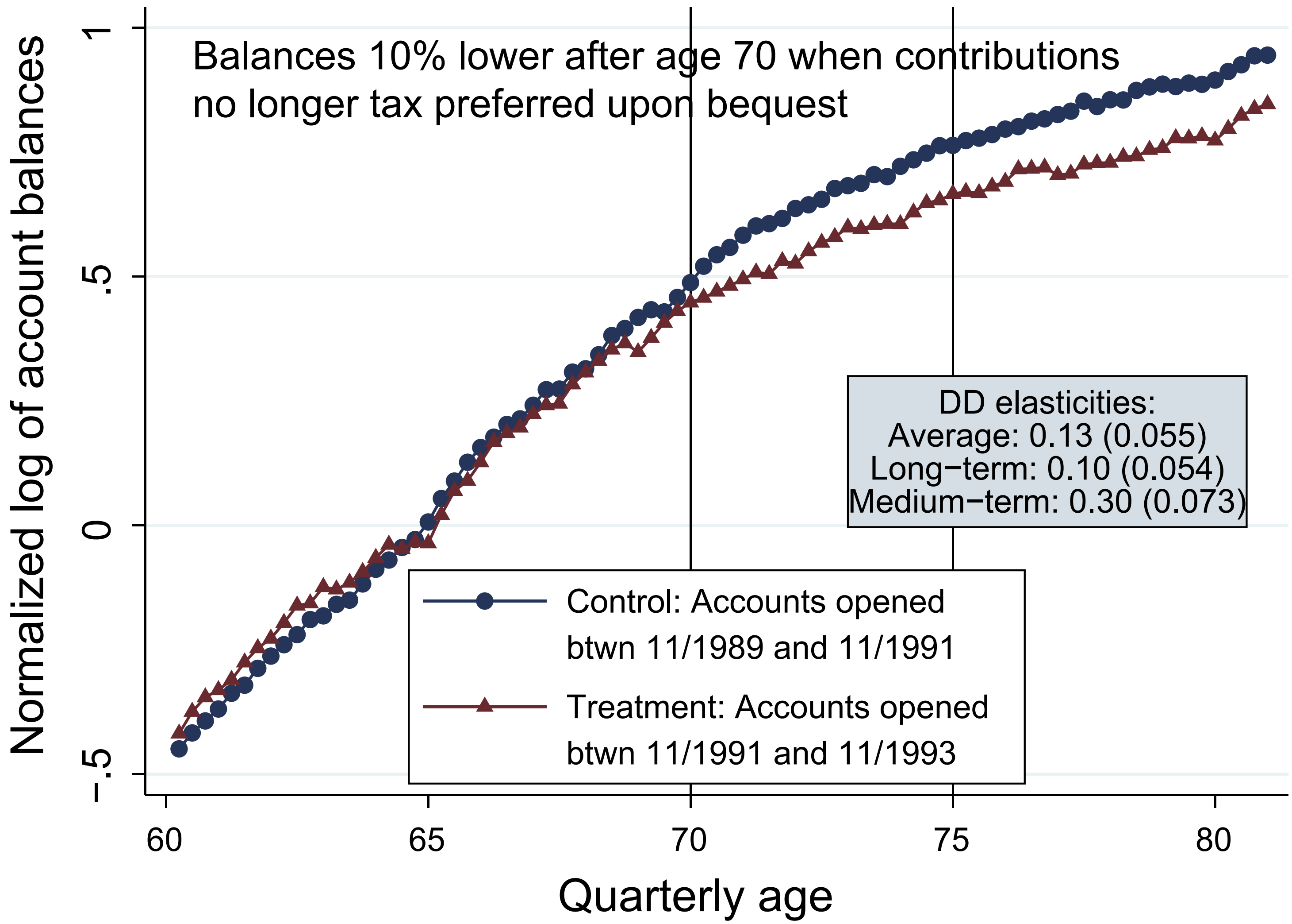
Short-term retiming: spike in contributions at age 70

Long-run real+shifting response: small DD in balances at age 70+ with elasticity wrt $1-\tau$ of .4 (combines real+shifting responses so real response even smaller)
$\Rightarrow$ Even wealthy individuals respond myopically (treatment should contribute heavily before 70)



Source: Goupille-Infante JpuE'18

A) FOR WEALTHY INDIVIDUALS



B) AVERAGE ACCOUNT BALANCES (INLOG) BY QUARTERLY AGE

Fig. 4. Impact of inheritance tax on wealth accumulation: Difference-in-differences evidence. Notes: The figure shows the normalized average log of (contributions + 1) and the normalized average log of (account balances + 1) by quarterly age in the control and treatment group. The normalization consists in subtracting to each aver-

ACCIDENTAL BEQUESTS

Bequest taxation has no distortionary effect on behavior of donor and can only increase labor supply of donees (through income effects)

$\Rightarrow$ strong case for taxing bequests heavily

Wealth loving: Same tax policy conclusion arises if donors have wealth in their utility function [social status or power, Carroll '98]

Kopczuk-Lupton REStud'07 shows that only 1/3 of people accumulate wealth for bequest motives

Bequests in the Utility: Warm Glow Or Altruistic

$u(c) - h(l) + \delta \cdot v(b)$ where c is own consumption, l is labor supply, and b is net-of-tax bequests left to next generation and $v(b)$ is warm glow utility of bequests

Budget with no estate tax: $c + b/(1 + r) = wl - T_L(wl)$

Budget with bequest tax at rate τ_B:
$c + b/[(1 + r)(1 - \tau_B)] = wl - T_L(wl)$

Suppose first that b is not bequeathed but used for "after-life" consumption [e.g., funerary monument of no value to next generation]

$\Rightarrow$ Atkinson-Stiglitz implies that b should not be taxed [$\tau_B = 0$] and that nonlinear tax on wl is enough for redistribution

Bequests in the Utility: Warm Glow Or Altruistic

Suppose now that b is given to a heir who derives utility $v^{heir}(b)$ $\Rightarrow$ b creates a positive externality (to donee) and hence should be subsidized $\Rightarrow$ $\tau_B < 0$ is optimal

Kaplow '01 makes this point informally

Farhi-Werning QJE'10 develop formal model of non-linear Pigouvian subsidization of bequests with 2 generations and social Welfare:

$$SWF = \int [u(c) - h(l) + \delta v(b) + v^{heir}(b)] f(w) dw$$

The marginal external effect of bequests is dv^{heir}/db and hence should be smaller for large b

$\Rightarrow$ Optimal subsidy rate is smaller for large estates $\Rightarrow$ progressive estate subsidy

A-S Fails with Inheritances In General Equilibrium (Piketty-Saez ECMA'13)

Atkinson-Stiglitz applies when sole source of lifetime income is labor:

$c+b(left)/(1+r) = wl-T(wl)$ ($w =$ productivity, $l =$ labor supply)

In GE, bequests provide an additional source of life-income:

$$c + b(left)/(1 + r) = wl - T(wl) + b(received)$$

$\Rightarrow$ conditional on wl, high $b(left)$ is a signal of high $b(received)$
$\Rightarrow$ $b(left)$ should be taxed even with optimal $T(wl)$

$\Rightarrow$ Two-dim. inequality requires two-dim. tax policy tool

Extreme example: no heterogeneity in productivity w but pure heterogeneity in bequests motives $\Rightarrow$ bequest taxation is desirable for redistribution

Piketty-Saez Simplified Optimal Inheritance Tax Model

Measure one of individuals, who are both bequests receivers and bequest leavers (in ergodic general equilibrium)

Linear tax τ_B on bequests funds lumpsum grant E

Life-time budget constraint: $c_i + b_i = R(1 - \tau_B)b_i^r + y_{Li} + E$

with c_i consumption, b_i bequests left, y_{Li} inelastic labor income, b_i^r pre-tax bequests received, $R = 1 + r$ generational rate of return on bequests

Individual i has utility $V^i(c, \underline{b})$ with $\underline{b} = R(1 - \tau_B)b$ net-of-tax bequests left and solves

$$\max_{b_i} V^i(y_{Li}+E+R(1-\tau_B)b_i^r-b_i, Rb_i(1-\tau_B)) \Rightarrow V_c^i = R(1-\tau_B)V_{\underline{b}}^i$$

Piketty-Saez ECMA'13 Optimal Inheritance Tax

Government budget constraint is $E = \tau_B b$ with b aggregate (=average) bequests. Govt solves:

$$\max_{\tau_B} \int_i \omega_i V^i(y_{Li} + \tau_B b + R(1-\tau_B)b_i^r - b_i, Rb_i(1-\tau_B))$$

with $\omega_i \geq 0$ Pareto weights

Meritocratic Rawlsian criterion: maximize welfare of those receiving no inheritances with uniform social marginal welfare weight $\omega_i V_c^i$ among zero-receivers

(e.g., people not responsible for b_i^r but responsible for y_{Li}) $\Rightarrow$

$$\textbf{Optimal inheritance tax rate: } \tau_B = \frac{1-\bar{b}}{1+e_B}$$

with $e_B = \frac{1-\tau_B}{b}\frac{db}{d(1-\tau_B)}$ elasticity of aggregate bequests and $\bar{b} = \frac{E[b_i|b_i^r=0]}{b}$ relative bequest left by zero-receivers

Piketty-Saez ECMA'13 Optimal Inheritance Tax: Proof

$$SWF = \int_i \omega_i V^i(y_{Li} + \tau_B b - b_i, Rb_i(1 - \tau_B))$$

[NB: removed term $R(1 - \tau_B)b_i^r$ because $\omega_i = 0$ when $b_i^r = 0$]

$$0 = \frac{dSWF}{d\tau_B} = \int_i \omega_i \cdot \left(V_c^i \left[b - \tau_B \frac{db}{d(1 - \tau_B)} \right] - Rb_i V_{\underline{b}}^i \right) \Rightarrow$$

$$0 = \int_i \omega_i \cdot \left(V_c^i \cdot b \left[1 - \frac{\tau_B}{1 - \tau_B} e_B \right] - \frac{b_i}{1 - \tau_B} V_c^i \right) \Rightarrow$$

$$0 = b \left[1 - \frac{\tau_B}{1 - \tau_B} e_B \right] - \frac{1}{1 - \tau_B} \cdot \frac{\int_i \omega_i V_c^i \cdot b_i}{\int_i \omega_i V_c^i} \Rightarrow$$

as $\omega_i V_c^i \equiv 0$ for $b_i^r > 0$ and $\omega_i V_c^i \equiv 1$ for $b_i^r = 0 \Rightarrow$

$$0 = 1 - \tau_B - \tau_B \cdot e_B - \frac{E[b_i | b_i^r = 0]}{b} \Rightarrow \tau_B = \frac{1 - \bar{b}}{1 + e_B}$$

Piketty-Saez ECMA'13 Optimal Inheritance Tax

Optimal inheritance tax rate: $\tau_B = \dfrac{1-\bar{b}}{1+e_B}$

1) Optimal $\tau_B < 1/(1+e_B)$ revenue maximizing rate because zero-receivers care about bequests they leave

2) $\tau_B = 0$ if $\bar{b} = 1$ (i.e, zero-receivers leave as much bequest as average)

3) If bequests are quantitatively important, highly concentrated, and low wealth mobility then $\bar{b} << 1$

4) Empirically e_B small (Kopcuzk-Slemrod '01) but poorly known, $\bar{b} = 2/3$ in US (SCF data) but poorly measured

5) Formula can be extended to other social criteria, elastic labor supply, wealth loving preferences, altruistic preferences [see Piketty-Saez ECMA'13]

MANIPULATIVE BEQUESTS

Parents use potential bequest to extract favors from children

Empirical Evidence: Bernheim-Shleifer-Summers JPE '85 show that number of visits of children to parents is correlated with bequeathable wealth but not annuitized wealth of parents

$\Rightarrow$ Bequest becomes one additional form of labor income for donee and one consumption good for donor

$\Rightarrow$ Inheritances should be counted and taxed as labor income for donees

SOCIAL-FAMILY PRESSURE BEQUESTS

Parents may not want to leave bequests but feel compelled to by pressure of heirs or society: bargaining bt parents and kids

With estate tax, parents do not feel like they need to give as much $\Rightarrow$ parents are made better-off by the estate tax $\Rightarrow$ Case for estate taxation stronger [Atkinson-Stiglitz does not apply and no double counting of bequests]

Empirical evidence:

Aura JpubE'05: reform of private pension annuities in the US in 1984 requiring both spouses signatures when retiring worker decides to get a single annuity or couple annuity: reform increased sharply couple annuities choice $\Rightarrow$ Higher spousal bequest when spouse has more say

Equal division of estates [Wilhelm AER'96, Light-McGarry '04]: estates are very often divided equally but gifts are not

DYNASTIC MODEL OR INFINITE HORIZON

Special case of warm glow: $V_t = u(c_t, l_t) + V_{t+1}/(1+\delta)$ implies

$$V_0 = \sum_{t \geq 0} u(c_t, l_t)/(1+\delta)^t$$

$$\text{subject to } \sum_{t \geq 0} c_t/(1+r)^t = \sum_{t \geq 0} w_t l_t/(1+r)^t$$

Dynasty with **Ricardian equivalence:** consumption c_t depends only on PDV of earnings of dynasty (not $w_t l_t$)

Poor empirical fit:

1) Altonji-Hayashi-Kotlikoff AER'92, JPE'97 show that income shocks to parents have bigger effect on parents consumption than on kids consumption (and conversely)

2) Temporary tax cut debt financed [fiscal stimulus] should have no impact on consumption but actually do

INFINITE HORIZON MODEL: CHAMLEY-JUDD

Govt can collect taxes using linear labor income tax or capital income taxes that vary period by period τ_L^t, τ_K^t

Goal of the government is to maximize utility of the dynasty

$$V_0 = \sum_t u(c_t, l_t)/(1+\delta)^t \text{ st } \quad \sum_t q_t c_t \le \sum_t q_t w_t (1-\tau_L^t) l_t + A_0 \quad (\lambda)$$

$$q_0 = 1, \ldots, q_t = 1/\prod_{s=1}^t (1 + r_s(1 - \tau_K^s)), \ldots$$

With constant tax rate τ_K and constant r: Before tax price: $p_t = 1/(1+r)^t$ and after-tax price $q_t = 1/(1 + r(1-\tau_K))^t \Rightarrow$

Price distortion q_t/p_t grows exponentially with time

CHAMLEY-JUDD: RESULTS

Chamley-Judd show that the capital income tax rate always tends to zero asymptotically: no capital tax in the long-run:

Two equivalent ways to understand this result:

(1) A constant tax on capital income creates an exponentially growing distortion which is inefficient

(2) The PDV of the capital income tax base is infinitely elastic with respect to an increase in τ_K in the distant future [Piketty-Saez '13]

Intuition: $u_c(c_{t+1})/u_c(c_t) = (1+\delta)/(1+r(1-\tau_K)) \Rightarrow$ savings decisions infinitely elastic to $r(1-\tau_K)-\delta$

If $r(1-\tau_K) > \delta$, accumulate forever. If $r(1-\tau_K) < \delta$, get in debt as much as possible.

ISSUES IN INFINITE HORIZON MODEL

1) Taxing initial wealth is most efficient [as this is lumpsum taxation] $\Rightarrow$ solutions typically bang-bang: tax capital as much as possible early, then zero

2) Chamley-Judd tax is not time consistent: the government would like to renege and start taxing capital again

3) Chamley-Judd may not technically hold if intertemporal elasticity of substitution is below 1 as a capital tax encourages savings in this case (Werning-Straub '20)

4) Dynastic model requires strong homogeneity assumptions (in discount rates) to generate reasonable steady states [unlikely to hold in practice]

5) Introducing stochastic shocks in labor/preferences [Aiyagari JPE'95, Piketty-Saez ECMA'13] or wealth in the utility function [Saez-Stantcheva '18] in dynamic model leads to finite elasticities (and reasonable optimal tax rates)

US WEALTH TAX DEBATE

Recent proposals for progressive wealth tax (Warren, Sanders). Various justifications from center left to radical left:

(1) Revenue: US wealth is top heavy $\Rightarrow$ well enforced wealth tax can raise substantial revenue

(2) Tax fairness: super-rich do not need to "realize" income and hence pay fairly low taxes relative to their true incomes (Saez-Zucman '19, Propublica leak)

(3) Oligarchy risk: wealth at the top is power. Evidence from Robber Barons US 19th century and devo countries that entrenched wealth stifles growth (Acemoglu-Robinson '12)

Concerns of opponents: Wealth tax will be easy to avoid/evade. If not, wealth tax will discourage entrepreneurs.

US WEALTH TAX DEBATE

Politically: wealth tax is easy for public to understand as a tax on the rich (and polls well even among republicans)

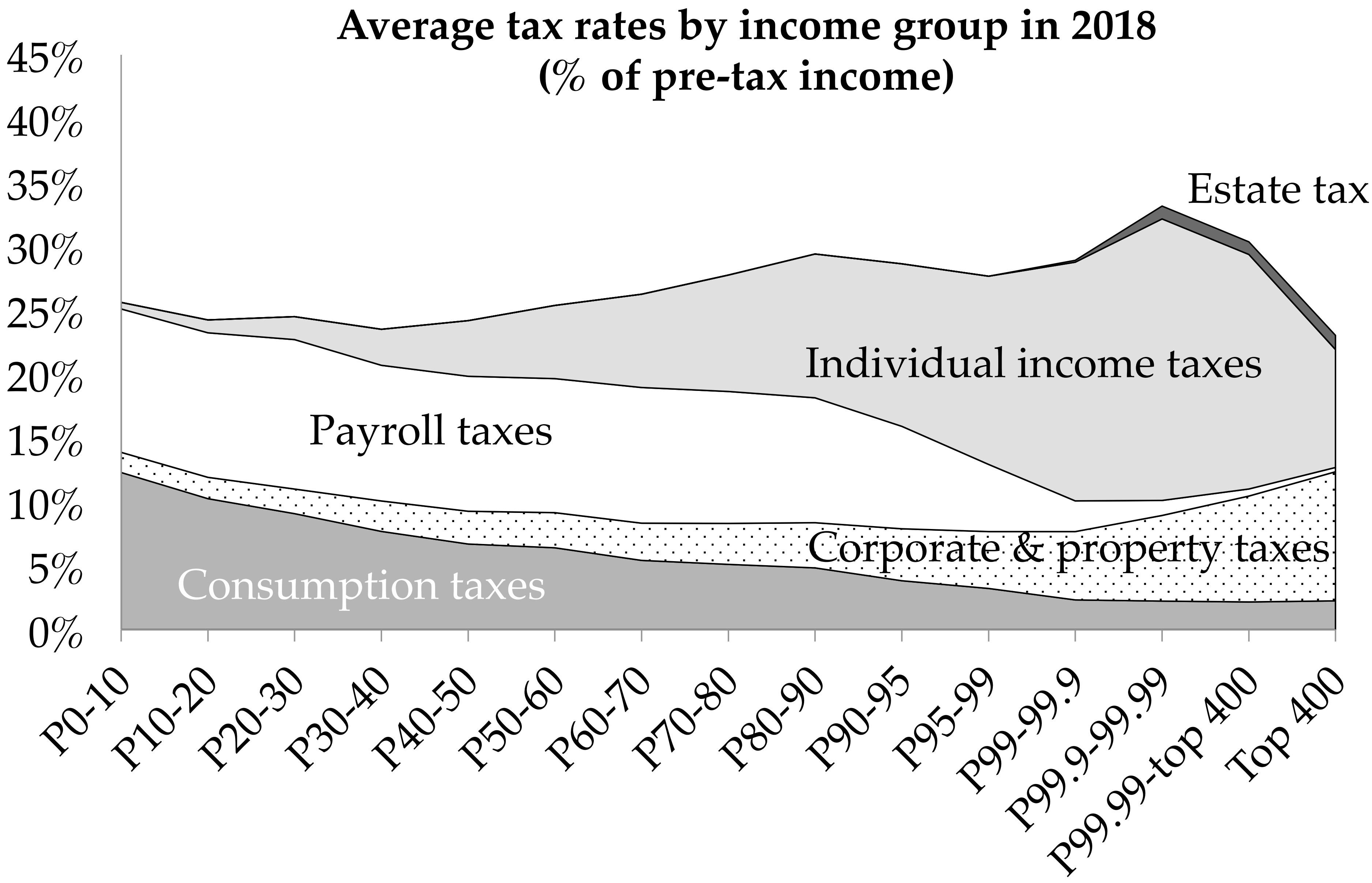
Economically: wealth tax powerful because

(1) wealth tax goes after the stock while a capital income tax goes after the flow: example if rate of return is $r = 5\%$, a wealth tax at rate 5% is like taxing capital income at 100%.

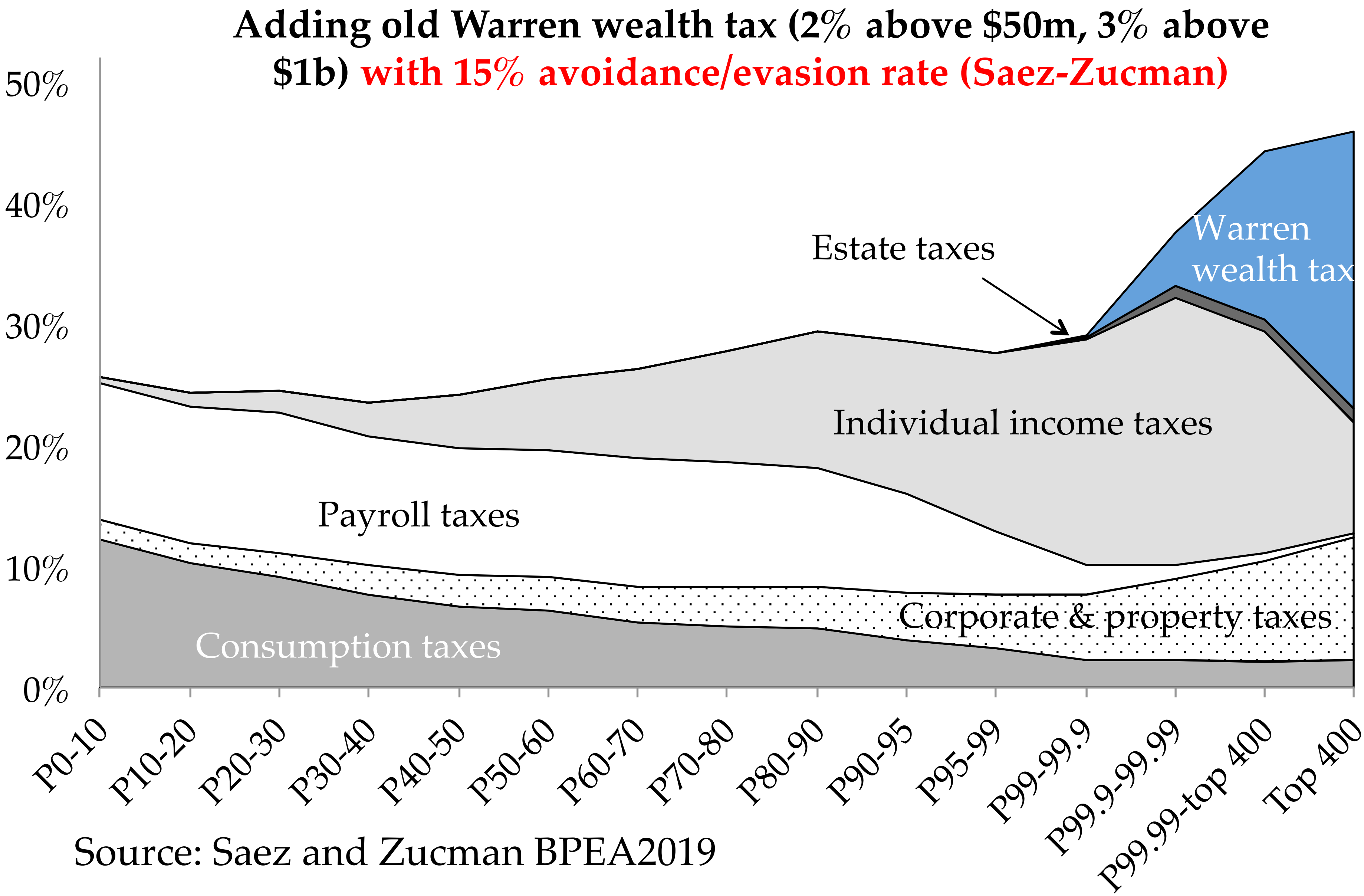
(2) Capital income tax discourages high returns but wealth tax doesn't (Allais 1966, Guvenen et al. QJE'23)

(3) wealth tax builds overtime: for billionaires, wealth tax mechanically reduces wealth by $(1-\tau_W)$ after 1 year, $(1-\tau_W)^2$ after 2 years, ..., $(1-\tau_W)^t$ after t years, etc. (Blanchet '22)

$\Rightarrow$ Billionaires can still arise but don't stay billionaires as long



Source: Saez and Zucman 2019

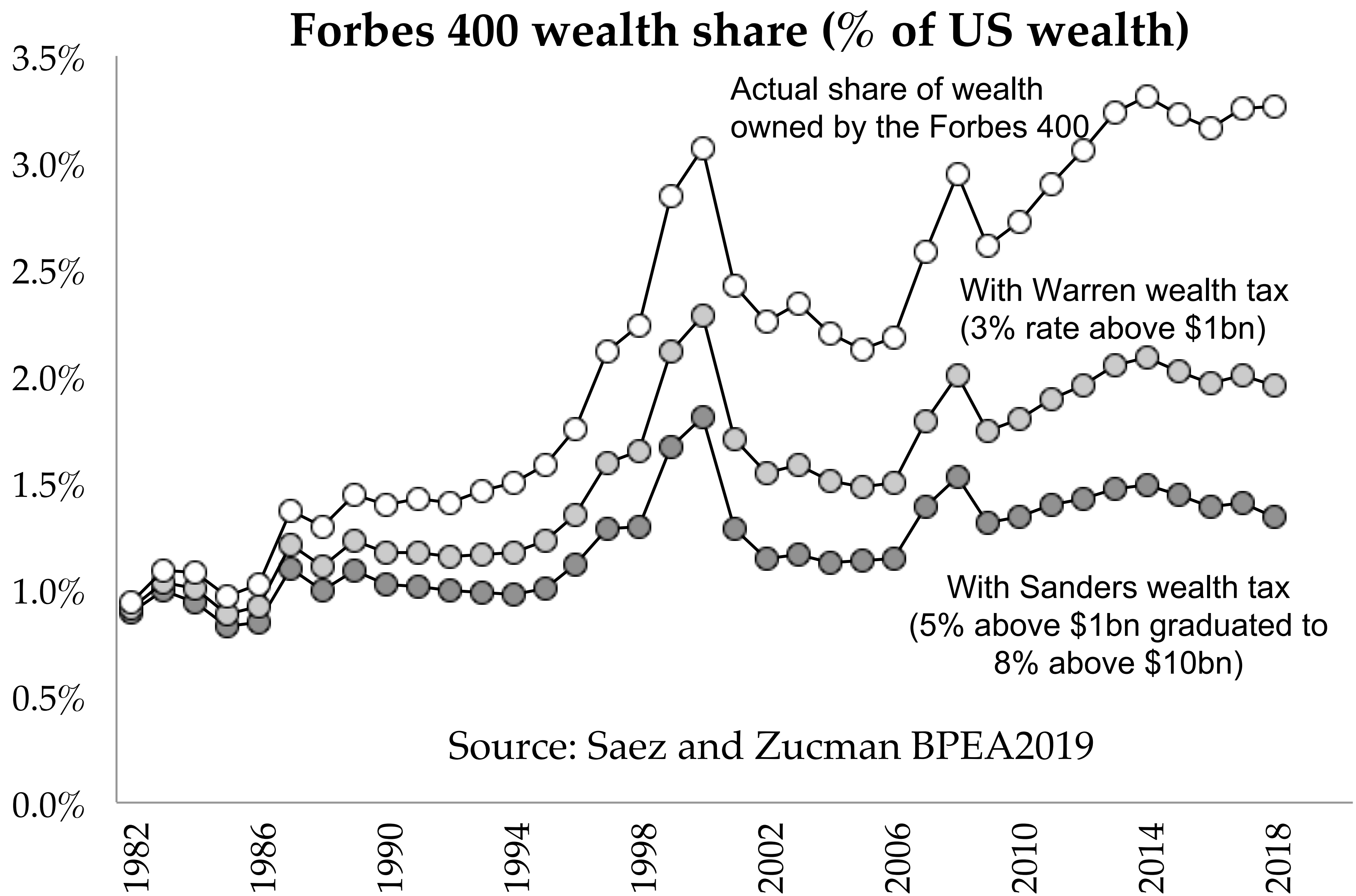


Source: Saez and Zucman BPEA2019

Long-Term Wealth Taxation and Top Wealth Holders

Top Wealth Holder	Source	Current 2018 wealth ($ billions)	With Warren wealth tax (3% above $1b) since 1982	With Sanders wealth tax (5% above $1b up to 8% above $10b)
1. Jeff Bezos	Amazon (founder)	160.0	86.8	43.0
2. Bill Gates	Microsoft (founder)	97.0	36.4	9.9
3. Warren Buffett	Berkshire Hathaway	88.3	29.6	8.2
4. Mark Zuckerberg	Facebook (founder)	61.0	44.2	28.6
5. Larry Ellison	Oracle (founder)	58.4	23.5	8.5
6. Larry Page	Google (founder)	53.8	35.3	19.5
7. David Koch	Koch industries	53.5	18.9	8.0
8. Charles Koch	Koch industries	53.5	18.9	8.0
9. Sergey Brin	Google (founder)	52.4	34.4	19.0
10. M. Bloomberg	Bloomberg LP (f.)	51.8	24.2	11.3
11. Jim Walton	Walmart (heir)	45.2	15.1	5.0
…				
Total top 15		942.5	433.9	195.7

Source: Saez and Zucman BPEA2019


Forbes 400 wealth share (% of US wealth)
3.5%
3.0%
2.5%
2.0%
1.5%
1.0%
0.5%
0.0%
Actual share of wealth owned by the Forbes 400
With Warren wealth tax (3% rate above $1bn)
With Sanders wealth tax (5% above $1bn graduated to 8% above $10bn)
Source: Saez and Zucman BPEA2019
1982
1986
1990
1994
1998
2002
2006
2010
2014
2018

WEAKNESSES WITH EXISTING WEALTH TAXES

Wealth taxes have been used in Europe but most repealed (and never raised much revenue, except Switzerland). 4 issues:

1) Offshore tax evasion: easy to hide wealth illegally in tax havens before FATCA/Common Reporting Standard

2) Concerns about mobility of the rich: could move out of the country to legally avoid wealth tax (see Jacobsen et al. 2023 for Swedish wealth tax abolition).

3) Exemption threshold too low (like $1m) creating hardship for illiquid millionaires, led to

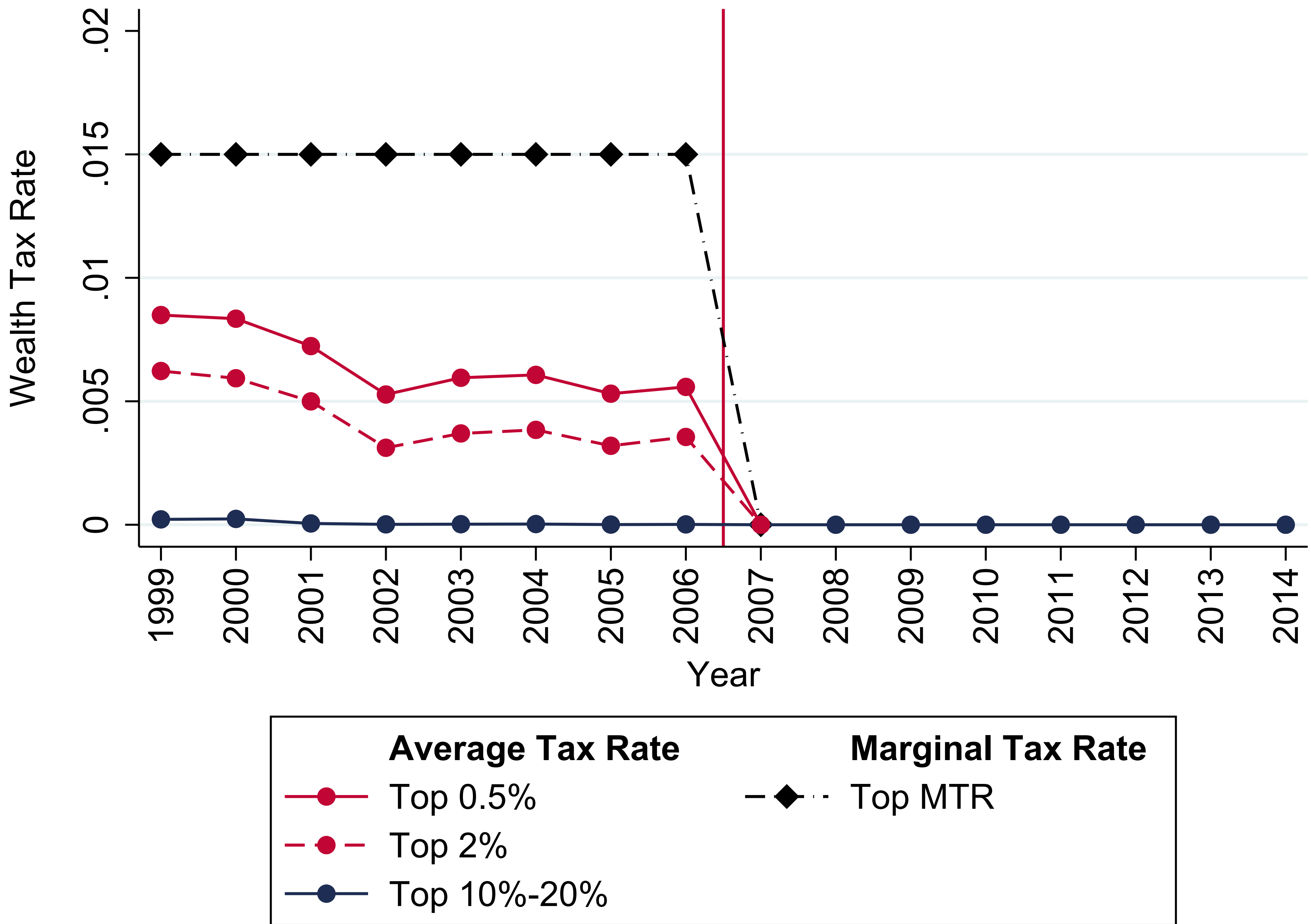
a) Inefficient illiquid asset exemptions such exempting stock of owner-managers benefitting ultrarich (Alvaredo-Saez '09 for Spain, Bach et al. 23 for France which exempted both public/private stock of owners/managers)

b) Tax limits based on reported individual income which defeats the wealth tax purpose (Bach et al. 23 for tax rates in France)

4) Reliance on self-assessment (see Garbinti et al. 2023 for France)

Wealth Tax Rates in Sweden

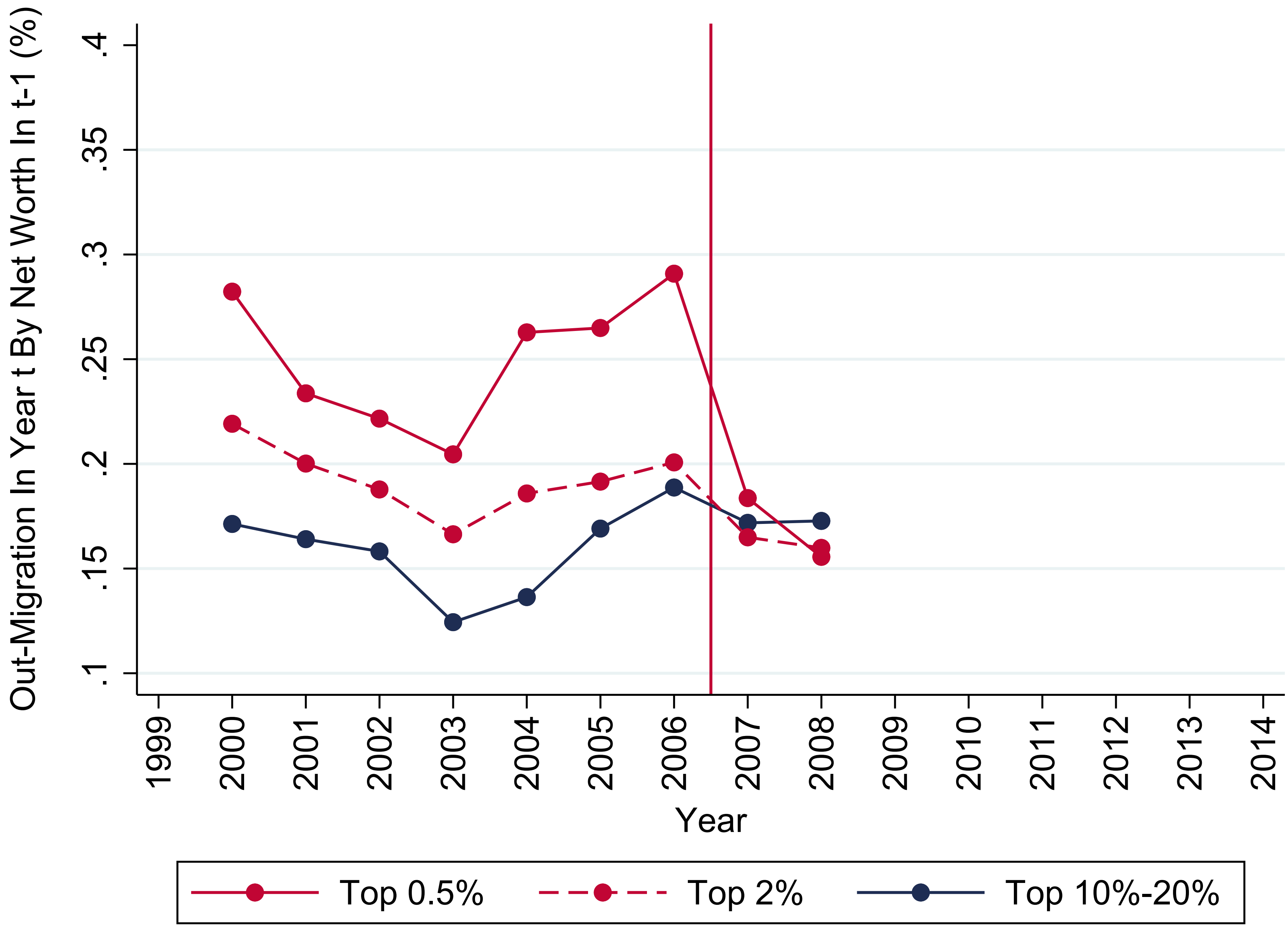
Exposure to the Reform by Distance to the Exemption Threshold



Source: Jacobsen et al. 2023

Wealth Tax Rates in Sweden

Exposure to the Reform by Distance to the Exemption Threshold



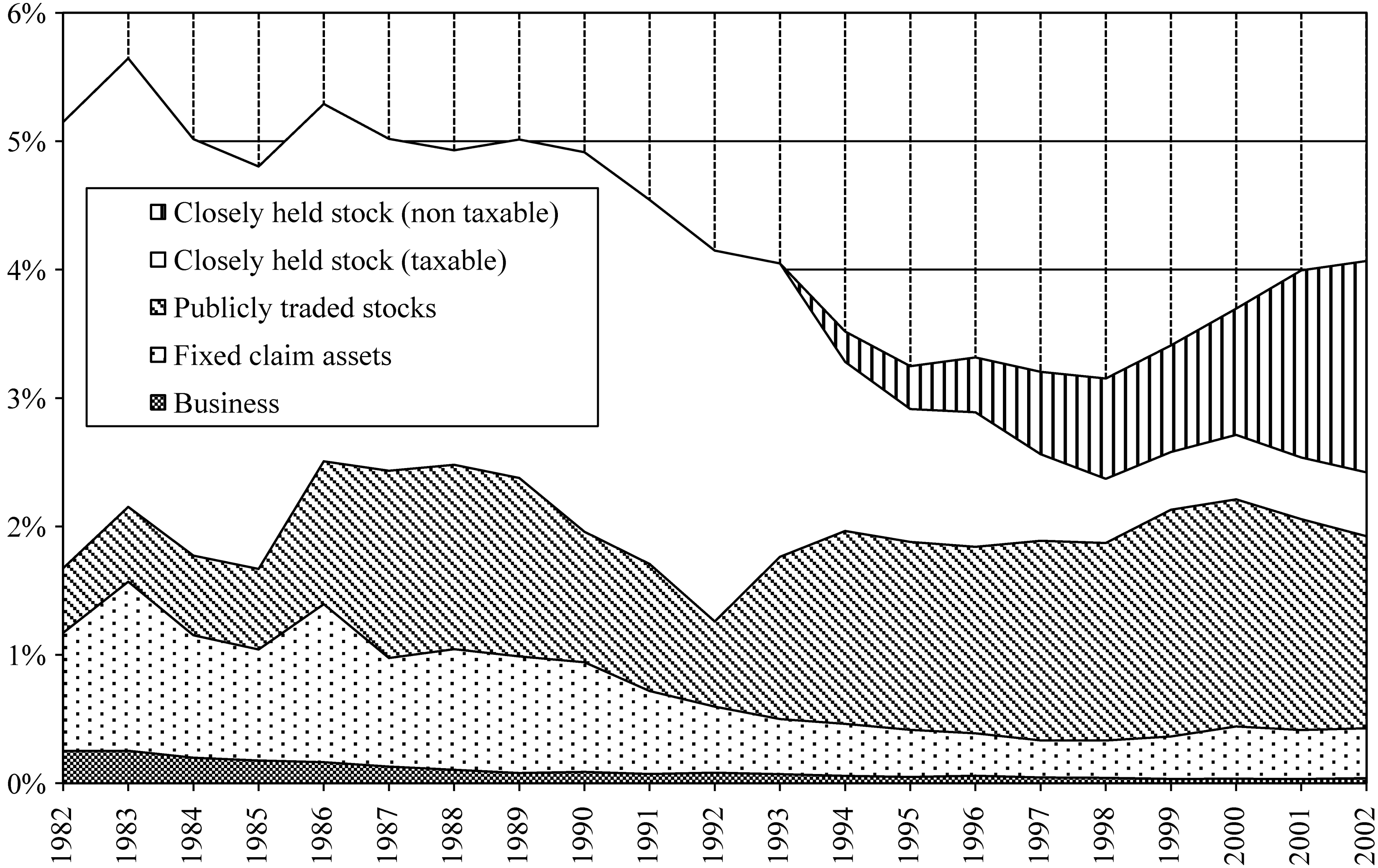


FIGURE 10. The top 0.01% financial wealth share and composition in Spain, 1982–2002. The figure displays the financial wealth share and composition of the top 0.01% tax units. Stocks are broken down into three components: publicly traded stocks, taxable closely held stocks, and exempted closely held stocks. Source: Table E1 and E2, and direct computations based on wealth tax statistics. Closely held stock of owners/managers becomes exempt in 1994 for Spanish wealth tax

Personal and corporate taxes along the comprehensive income distribution

- Billionaires almost only pay the CIT

Source: Bach et al. 2023, tax rates in France when wealth tax existed in 2016

FRANCE WEALTH TAX SIMPLIFIED FORM

Since 2013, taxpayers with wealth below 2.57m Euros can only report total net wealth without having to provide details by category of assets

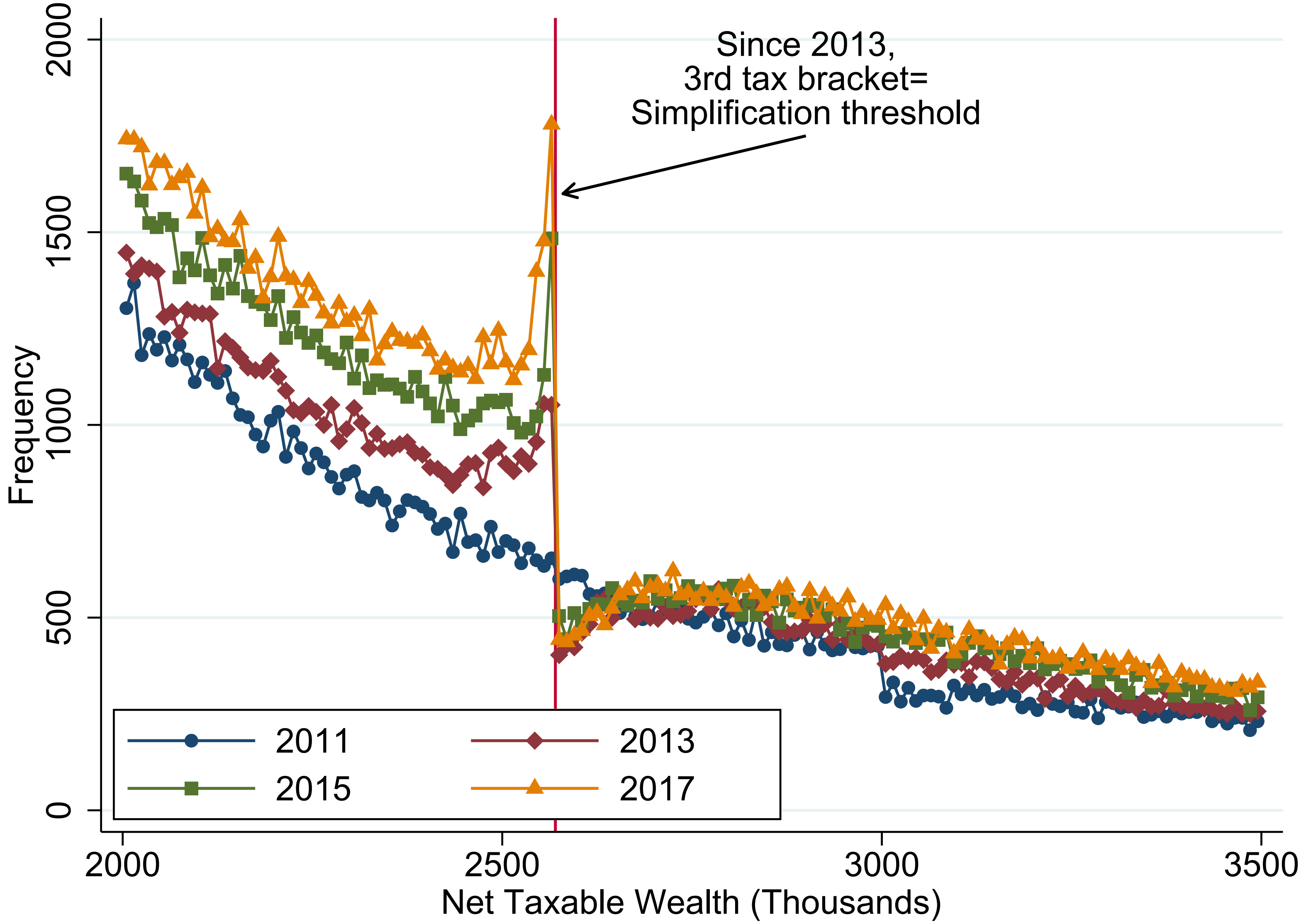
Makes it a lot harder for the tax administration to police tax returns (e.g., check property address and value for real estate)

Garbinti et al. (2023) show that taxpayers strongly prefer to locate in the "simplified" bracket with bunching at the threshold

$\Rightarrow$ Strong evidence that individuals manipulate wealth to avoid extra reporting requirement and reduce wealth tax

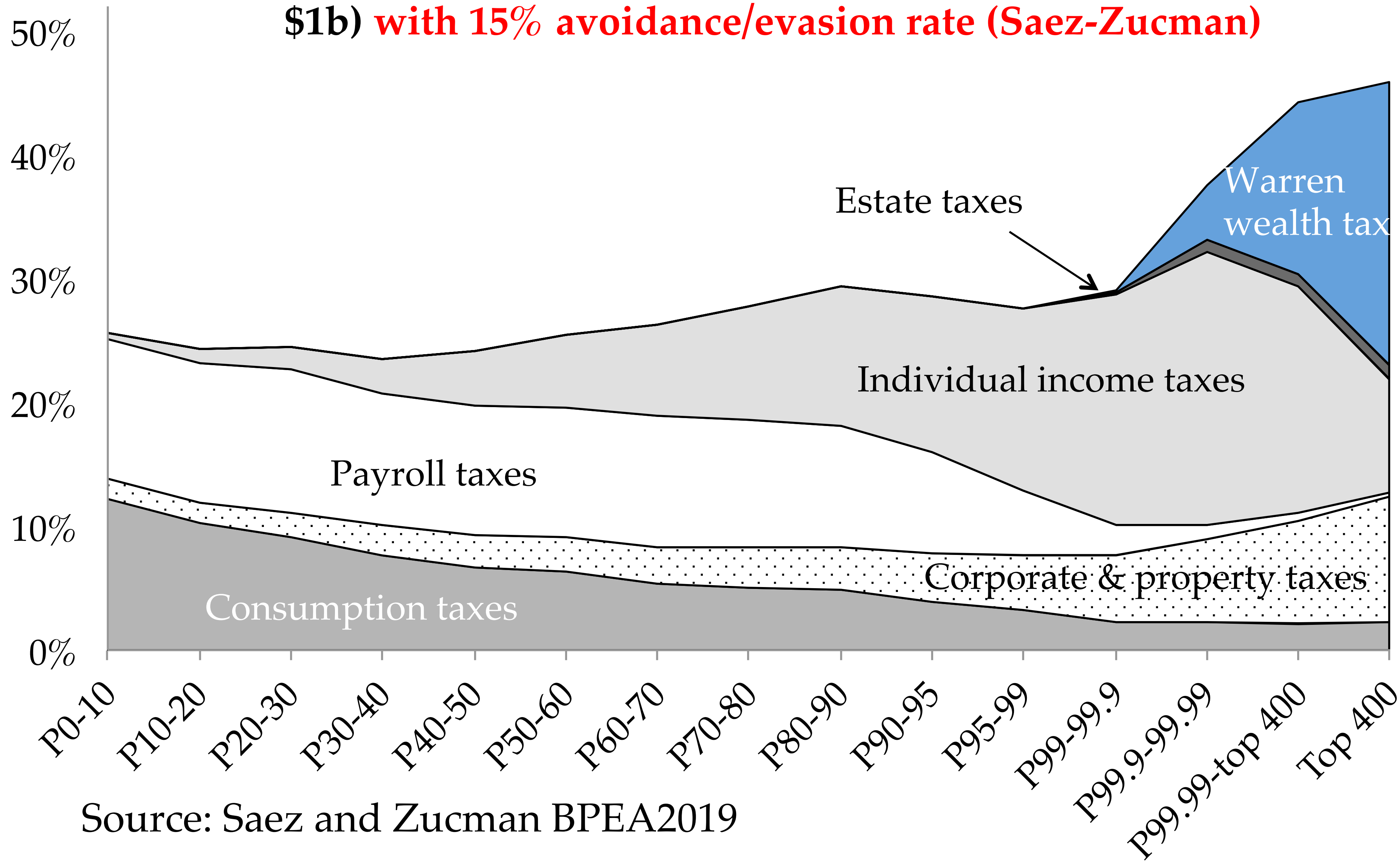
Note: Poorly functioning french wealth tax repealed in 2017 and replaced by a new progressive tax on french real estate wealth only (the new tax looks like a regression but looks progressive relative to US type flat property taxes)

D. Simplification Threshold is 2,570K for 2013-2017



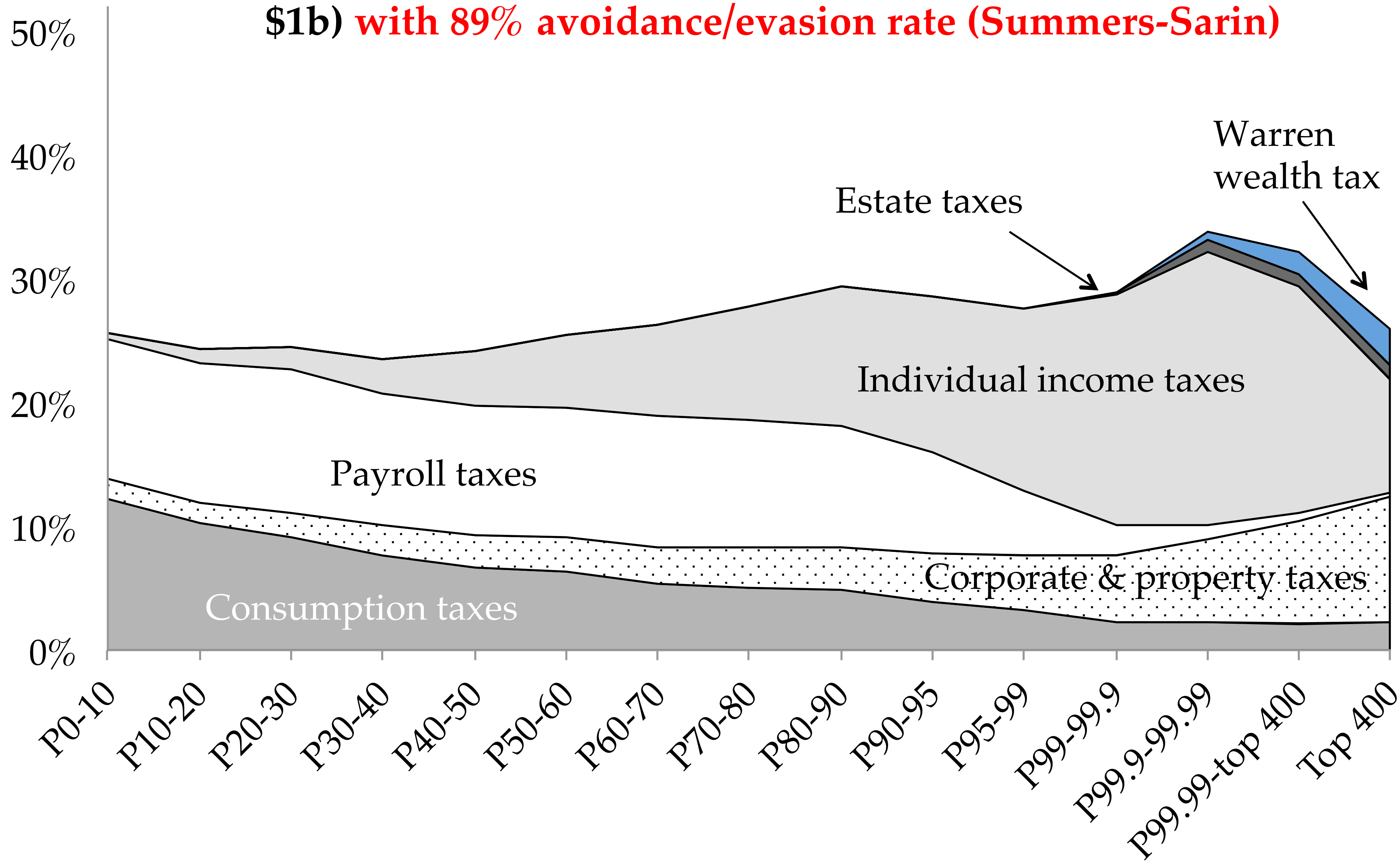
Source: Garbinti et al. 2023

Adding old Warren wealth tax (2% above \$50m, 3% above \$1b) with 15% avoidance/evasion rate (Saez-Zucman)



Source: Saez and Zucman BPEA2019

Adding old Warren wealth tax (2% above \$50m, 3% above \$1b) with 89% avoidance/evasion rate (Summers-Sarin)



COULD A WEALTH TAX BE ENFORCED?

In principle, all 4 issues could be remedied:

1) Fight offshore tax evasion with FATCA/Common Reporting Standard

2) Tax expatriates for a number of years (extreme case: US taxes its citizens abroad forever and imposes big exit tax upon renouncing citizenship)

3) Set high exemption threshold ($50m rather than $1m) but use comprehensive tax base including all assets valued at market rates.

Make payments for large private businesses in shares rather than cash if there are disagreements about value (Saez-Zucman 2019b)

4) Develop systematic information reporting for wealth just like for income (as is done in Denmark)

NEW DYNAMIC PUBLIC FINANCE: REFERENCES

Dynamic taxation in the presence of future earnings uncertainty

Literature in macro PF following upon on Golosov, Kocherlakota, Tsyvinski REStud '03 (GKT)

Principle can be understood in 2 period model: Diamond-Mirrlees JpubE '78 and Cremer-Gahvari EJ '95

Generalized to many periods by GKT and subsequent papers

Simple exposition is Kocherlakota AER-PP '04

Two comprehensive surveys: Golosov-Tsyvinski-Werning '06 and Kocherlakota '10 book

NEW DYNAMIC PUBLIC FINANCE (NDPF)

Key ingredient is uncertainty in future ability w

2 period simple model:

(0) Everybody is identical in period 0: no work and consume c_0, period 0 utility is $u(c_0)$

(1) Ability w revealed in period 1, work l and earn $z = wl$, consume c_1, period 1 utility $u(c_1) - h(l)$

Total utility $u(c_0) + \beta[u(c_1) - h(l)]$

Rate of return r, gross return $R = 1 + r$

Discount rate $\beta < 1$

STANDARD EULER EQUATION

No govt intervention: $c_0 + c_1/R = wl/R$

Solve model backward (assume c_0 given):

Period 1: $c_1 = wl - Rc_0$, choose l to maximize $u(wl - Rc_0) - h(l)$

$\Rightarrow$ FOC $wu'(wl - Rc_0) = h'(l) \Rightarrow l^* = l(w, c_0)$

Period 0: Choose c_0 to maximize:

$$u(c_0) + \beta \int [u(wl^* - Rc_0) - h(l^*)] f(w) dw$$

FOC for c_0 (using envelope condition for l^*)

$$u'(c_0) = \beta R \int u'(c_1) f(w) dw$$

This is called the **Euler equation**

MECHANISM DESIGN

Government would like to redistribute from high w to low w. Government does not observe w but can observe $c_0, c_1, z = wl$ and can set taxes as a function of c_0, c_1, z

Equivalently (using revelation principle), govt can offer menu $(c_0, c_1(w), z(w))_w$ and let individuals truthfully reveal their w

Govt program: choose menu $(c_0, c_1(w), z(w))_w$ to maximize:

$$SW = u(c_0) + \beta \int [u(c_1(w)) - h(z(w)/w)] f(w) dw \text{ st}$$

1) Budget: $c_0 + \int c_1(w) f(w) dw/R \leq \int z(w) f(w) dw/R$

2) Incentive Compatibility (IC): individual w prefers $c_0, c_1(w), z(w)$ to any other $c_0, c_1(w'), z(w')$

INVERSE EULER EQUATION

Inverse Euler equation holds at the govt optimum:

$$\frac{1}{u'(c_0)} = \frac{1}{\beta R} \cdot \int \frac{1}{u'(c_1(w))} f(w)dw$$

Proof: small deviation in menus offered: $\Delta c_0 = -\varepsilon / u'(c_0)$ and $\Delta c_1(w) = \varepsilon / [\beta u'(c_1(w))]$ with small $\varepsilon > 0$

Does not affect individual utilities in any state:

$$u(c_0 + \Delta c_0) + \beta u(c_1(w) + \Delta c_1(w)) =$$

$$u(c_0) + \beta u(c_1(w)) + \Delta c_0 u'(c_0) + \Delta c_1(w) \beta u'(c_1(w)) = u(c_0) + \beta u(c_1(w))$$

$\Rightarrow$ (IC) continues to hold and SW unchanged

Deviation must be budget neutral at optimum

$$\Rightarrow -\frac{\varepsilon}{u'(c_0)} + \frac{1}{R} \int \frac{\varepsilon f(w)dw}{\beta u'(c_1(w))} = 0$$

INTERTEMPORAL WEDGE

Jensen Inequality: for $K(.)$ convex

$$\Rightarrow K\left(\int x(w)dF(w)\right) < \int K(x(w))dF(w)$$

Apply this to $K(x) = 1/x$ and $x(w) = u'(c_1(w)) \Rightarrow$

$$\frac{1}{\int u'(c_1(w))f(w)dw} < \int \frac{f(w)dw}{u'(c_1(w))} = \frac{\beta R}{u'(c_0)}$$

$$\Rightarrow u'(c_0) < \beta R \int u'(c_1(w))f(w)dw$$

$\Rightarrow$ Optimal govt redistribution imposes a positive tax wedge on intertemporal choice

NDPF DECENTRALIZATION AND INTUITION

Decentralization: Optimum can be decentralized with a tax on capital income [which depends on current labor income] along with a nonlinear tax on wage income [Kocherlakota EMA'06]

Economic intuition: If high skill person works less (to imitate lower skill person), person would also like to reduce c_0 and hence save more, so tax on savings is a good way to discourage imitation

Result depends crucially on rationality in inter-temporal choices + income effects on labor: not clear yet how applicable this is in practice

Would be valuable to explore empirically for example whether DI (disability insurance) cheaters were saving more than non cheaters [would require merging SSA data and tax/wealth data, hard to do]

NDPF NUMERICAL SIMULATIONS

Farhi-Werning '11 propose numerical calibration and show that, for realistic parameters, the welfare gain of using full nonlinear optimal capital/labor taxation is very small (0.1% in aggregate welfare) relative to using only optimal labor taxation

Golosov-Troshkin-Tsyvinski '11 also find on average small welfare gains and small optimal capital tax rates

$\Rightarrow$ Suggests that the mechanism is not quantitatively important even assuming the theory is right

$\Rightarrow$ Policy relevance of the NDPF for capital taxation likely to be limited

DI/retirement application of NDPF might be quantitatively more important

REFERENCES

Acemoglu, Daron, and James Robinson. *Why nations fail: the origins of power, prosperity, and poverty.* Random House Digital, Inc., 2012.

Aiyagari, S. Rao. "Optimal capital income taxation with incomplete markets, borrowing constraints, and constant discounting." Journal of political Economy 103, no. 6 (1995): 1158-1175. (web)

Allais, Maurice, "Limpot sur le capital," Droit Social (29), 465544, 1966.

Altonji, J., F. Hayashi, and L. Kotlikoff "Is the Extended Family Altruistically Linked? Direct Tests Using Micro Data", American Economic Review, Vol. 82, 1992, 1177-98. (web)

Altonji, J., F. Hayashi and L. Kotlikoff "Parental Altruism and Inter Vivos Transfers: Theory and Evidence", Journal of Political Economy, Vol. 105, 1997, 1121-66. (web)

Alvaredo, Facundo, Bertrand Garbinti, and Thomas Piketty. 2017, "On the share of inheritance in aggregate wealth: Europe and the USA, 1900-2010." Economica 84(334), 239-260. (web)

Alvaredo, Facundo, and Emmanuel Saez. 2009. "Income and wealth concentration in Spain from a historical and fiscal perspective." Journal of the European Economic Association 7(5): 1140-1167. (web)

Atkinson, A.B. and A. Sandmo "Welfare Implications of the Taxation of Savings", Economic Journal, Vol. 90, 1980, 529-49. (web)

Atkinson, A.B. and J. Stiglitz "The design of tax structure: Direct versus indirect taxation", Journal of Public Economics, Vol. 6, 1976, 55-75. (web)

Atkinson, A.B. and J. Stiglitz Lectures on Public Economics, Chap 14-4 New York: McGraw Hill, 1980. (web)

Auerbach, A. and L. Kotlikoff "Evaluating Fiscal Policy with a Dynamic Simulation Model", American Economic Review, May 1987, 4955. (web)

Aura, S. "Does the Balance of Power Within a Family Matter? The Case of the Retirement Equity Act", Journal of Public Economics, Vol. 89, 2005, 1699-1717. (web)

Bach, Laurent, Antoine Bozio, Arthur Guillouzouic, and Clément Malgouyres. 2022 "Do billionaires pay taxes?" in preparation (web)

Bachas, Pierre, Matthew Fisher-Post, and Anders Jensen. 2022 "Globalization and Factor Income Taxation" NBER working paper No. 29819, March 2022. (web)

Banks J. and P. Diamond "The Base for Direct Taxation", IFS Working Paper, The Mirrlees Review: Reforming the Tax System for the 21st Century, Oxford University Press, 2009. (web)

Bernheim, B. D., A. Shleifer, and L. Summers "The Strategic Bequest Motive", Journal of Political Economy, Vol. 93, 1985, 1045-76. (web)

Blanchet, Thomas. 2022 "Uncovering the Dynamics of the Wealth Distribution", working paper forthcoming. (web)

Blanchet, Thomas, Emmanuel Saez, and Gabriel Zucman. 2022. "Real-Time Inequality: Methods and Estimates for the United States" (web)

Carroll, C. "Why Do the Rich Save So Much?", NBER Working Paper No. 6549, 1998. (web)

Chamley, C. "Optimal Taxation of Capital Income in General Equilibrium with Infinite Lives", Econometrica, Vol. 54, 1986, 607-622. (web)

Christiansen, Vidar and Matti Tuomala "On taxing capital income with income shifting", International Tax and Public Finance, Vol. 15, 2008, 527-545. (web)

Cremer, H. and F. Gahvari "Uncertainty and Optimal Taxation: In defense of Commodity Taxes", Journal of Public Economics, Vol. 56, 1995, 291-310. (web)

Davies, J. and A. Shorrocks, Chapter 11 The distribution of wealth, In: Anthony B. Atkinson and Francois Bourguignon, Editor(s), Handbook of Income Distribution, Elsevier, 2000, Vol. 1, 605-675. (web)

DeLong, J.B. "Bequests: An Historical Perspective," in A. Munnell, ed., *The Role and Impact of Gifts and Estates*, Brookings Institution, 2003 (web)

Diamond, P. and J. Mirrlees "A Model of Social Insurance with Variable Retirement", Journal of Public Economics, Vol. 10, 1978, 295-336. (web)

Diamond, Peter and Emmanuel Saez "The Case for a Progressive Tax: From Basic Research to Policy Recommendations", Journal of Economic Perspectives, 25(4), Fall 2011, 165-190. (web)

Diamond, P. and J. Spinnewijn "Capital Income Taxes with Heterogeneous Discount Rates", NBER Working Paper, No. 15115, 2009. (web)

Farhi E. and I. Werning "Progressive Estate Taxation", Quarterly Journal of Economics, Vol. 125, 2010, 635-673. (web)

Farhi E. and I. Werning "Capital Taxation: Quantitative Explorations of the Inverse Euler Equation," forthcoming *Journal of Political Economy* 2011. (web)

Feldstein, M. "The Welfare Cost of Capital Income Taxation", Journal of Political Economy, Vol. 86, 1978, 29-52. (web)

Finkelstein A. and J. Poterba, "Adverse Selection in Insurance Markets: Policyholder Evidence from the U.K. Annuity Market", Journal of Political Economy, Vol. 112, 2004, 183-208. (web)

Finkelstein A. and J. Poterba, “Selection Effects in the United Kingdom Individual Annuities Market”, The Economic Journal, Vol. 112, 2002, 28-50. (web)

Gale, William G. and John Karl Scholz, “Intergenerational Transfers and the Accumulation of Wealth”, Journal of Economic Perspectives, Vol. 8(4), 1994 145-160. (web)

Garbinti, Bertrand, Jonathan Goupille, Mathilde Munoz, Stefanie Stantcheva and Gabriel Zucman. 2023. “Tax Design, Information, and Elasticities: Evidence From the French Wealth Tax” (web)

Golosov, M., N. Kocherlakota and A. Tsyvinski “Optimal Indirect and Capital Taxation”, Review of Economic Studies, Vol. 70, 2003, 569-587. (web)

Golosov, M. and A. Tsyvinski “Designing Optimal Disability Insurance: A Case for Asset Testing”, Journal of Political Economy, Vol. 114, 2006, 257-279. (web)

Golosov, Mikhail, Maxim Troshkin, and Aleh Tsyvinski 2011. “Optimal Dynamic Taxes.” Princeton Working Paper (web)

Golosov, M., M. Troshkin, A. Tsyvinski and M. Weinzierl “Preference Heterogeneity and Optimal Commodity Taxation”, MIMEO Yale, July 2011. (web)

Golosov, M., A. Tsyvinski and I. Werning "New Dynamic Public Finance: a User's Guide" NBER Macro Annual 2006. (web)

Gordon, R.H. and J. Slemrod "Are "Real" Responses to Taxes Simply Income Shifting Between Corporate and Personal Tax Bases?," NBER Working Paper, No. 6576, 1998. (web)

Goupille-Lebret, Jonathan, and Jose Infante. "Behavioral responses to inheritance tax: Evidence from notches in France." Journal of Public Economics 168 (2018): 21-34. (web)

Guvenen, Fatih, Gueorgui Kambourov, Burhan Kuruscu, Sergio Ocampo, and Daphne Chen. 2023 "Use It or Lose It: Efficiency and Redistributional Effects of Wealth Taxation", Quarterly Journal of Economics. (web)

Holtz-Eakin, D., D. Joulfaian and H.S. Rosen "The Carnegie Conjecture: Some Empirical Evidence", Quarterly Journal of Economics Vol. 108, May 1993, pp.288-307. (web)

Jakobsen, Katrine, Henrik Kleven, Jonas Kolsrud and Camille Landais, Mathilde Munoz. 2023 "Wealth Taxation and Migration Patterns of the Wealthy: Evidence from Scandinavia", in preparation (web)

Judd, K. "Redistributive Taxation in a Simple Perfect Foresight Model", Journal of Public Economics, Vol. 28, 1985, 59-83. (web)

Kaplow, L. “A Framework for Assessing Estate and Gift Taxation”, in Gale, William G., James R. Hines Jr., and Joel Slemrod (eds.) *Rethinking estate and gift taxation* Washington, D.C.: Brookings Institution Press, 2001. (web)

Kaplow, L. “On the undesirability of commodity taxation even when income taxation is not optimal”, Journal of Public Economics, Vol.90, 2006, 1235-1260. (web)

Kennickell, A. “Ponds and streams: wealth and income in the U.S., 1989 to 2007”, Board of Governors of the Federal Reserve System (U.S.), Finance and Economics Discussion Series: 2009-13, 2009. (web)

King, M. “Savings and Taxation”, in G. Hughes and G. Heal, eds., Public Policy and the Tax System (London: George Allen Unwin, 1980), 1-36. (web)

Kocherlakota, N. “Wedges and Taxes”, American Economic Review, Vol. 94, 2004, 109-113. (web)

Kocherlakota, N. “Zero Expected Wealth Taxes: A Mirrlees Approach to Dynamic Optimal Taxation”, Econometrica, Vol.73, 2005. (web)

Kocherlakota, N. *New Dynamic Public Finance*, Princeton University Press: Princeton, 2010.

Kopczuk, W. "The Trick Is to Live: Is the Estate Tax Social Security for the Rich?", The Journal of Political Economy, Vol. 111, 2003, 1318-1341. (web)

Kopczuk, Wojciech "Taxation of Intergenerational Transfers and Wealth", in A. Auerbach, R. Chetty, M. Feldstein, and E. Saez (eds.), Handbook of Public Economics, Vol. 5 (Amsterdam: North-Holland, 2013). (web)

Kopczuk, Wojciech and Joseph Lupton 2007. "To Leave or Not to Leave: The Distribution of Bequest Motives," Review of Economic Studies, 74(1), 207-235. (web)

Kopczuk, Wojciech and Emmanuel Saez "Top Wealth Shares in the United States, 1916-2000: Evidence from Estate Tax Returns", National Tax Journal, 57(2), Part 2, June 2004, 445-487. (web)

Kopczuk, Wojciech and Joel Slemrod, "The Impact of the Estate Tax on the Wealth Accumulation and Avoidance Behavior of Donors", in William G. Gale, James R. Hines Jr., and Joel B. Slemrod (eds.), *Rethinking Estate and Gift Taxation,* Washington, DC: Brookings Institution Press, 2001, 299-343. (web)

Kotlikoff, L. "Intergenerational Transfers and Savings", Journal of Economic Perspectives, Vol. 2, 1988, 41-58. (web)

Kotlikoff, L. and L. Summers "The Role of Intergenerational Transfers in Aggregate Capital Accumulation", Journal of Political Economy, Vol. 89, 1981, 706-732. (web)

Kuziemko, Ilyana, Michael I. Norton, Emmanuel Saez, and Stefanie Stantcheva "How Elastic are Preferences for Redistribution? Evidence from Randomized Survey Experiments," NBER Working Paper No. 18865, 2013. (web)

Laroque, G. "Indirect Taxation is Superfluous under Separability and Taste Homogeneity: A Simple Proof", Economic Letters, Vol. 87, 2005, 141-144. (web)

Light, Audrey and Kathleen McGarry. "Why Parents Play Favorites: Explanations For Unequal Bequests," American Economic Review, 2004, v94(5,Dec), 1669-1681. (web)

Modigliani, F. "The Role of Intergenerational Transfers and Lifecyle Savings in the Accumulation of Wealth", Journal of Economic Perspectives, Vol. 2, 1988, 15-40. (web)

Norton, M. and D. Ariely "Building a Better America–One Wealth Quintile at a Time", Perspectives on Psychological Science 2011 6(9). (web)

Park, N. "Steady-state solutions of optimal tax mixes in an overlapping-generations model", Journal of Public Economics, Vol. 46, 1991, 227-246. (web)

Piketty, Thomas 2000. "Theories of Persistent Inequality and Intergenerational Mobility", In Atkinson A.B., Bourguignon F., eds. *Handbook of Income Distribution*, (North-Holland). (web)

Piketty, T. "Income Inequality in France, 1901-1998", CEPR Discussion Paper No. 2876, 2001 (appendix with optimal capital tax point). (web)

Piketty, T. "Income Inequality in France, 1901-1998", Journal of Political Economy, Vol. 111, 2003, 1004-1042. (web)

Piketty, T. "On the Long-Run Evolution of Inheritance: France 1820-2050", Quarterly Journal of Economics, 126(3), 2011, 1071-1131. (web)

Piketty, Thomas, *Capital in the 21st Century*, Cambridge: Harvard University Press, 2014, (web)

Piketty, Thomas, *Capital and Ideology*, Cambridge: Harvard University Press, 2020, (web)

Piketty, Thomas, Gilles Postel-Vinay and Jean-Laurent Rosenthal, "Inherited vs. Self-Made Wealth: Theory and Evidence from a Rentier Society (1872-1927)," Explorations in Economic History, 2014. (web)

Piketty, T. and E. Saez "Income Inequality in the United States, 1913-1998", Quarterly Journal of Economics, Vol. 118, 2003, 1-39. (web)

Piketty, T. and E. Saez "A Theory of Optimal Capital Taxation", NBER Working Paper No. 17989, 2012. (web)

Piketty, T. and E. Saez. "A Theory of Optimal Inheritance Taxation", Econometrica, 81(5), 2013, 1851-1886.(web)

Piketty, T., E. Saez, and G. Zucman. 2023 "Rethinking Capital and Wealth Taxation", *Oxford Review of Economic Policy* special issue *Taxing the Rich (More)*. (web)

Piketty, T. and G. Zucman "Capital is Back: Wealth-Income Ratios in Rich Countries, 1700-2010", Quarterly Journal of Economics, 2014 (web)

Piketty, T. and G. Zucman "Wealth and Inheritance in the Long-Run", Handbook of Income Distribution, Volume 2, Elsevier-North Holland, 2014 (web)

Pirttila, Jukka and Hakan Selin, "Income shifting within a dual income tax system: evidence from the Finnish tax reform," Scandinavian Journal of Economics, 113(1), 120-144, 2011. (web)

Rognlie, Matthew. 2015 "Deciphering the fall and rise in the net capital share: accumulation, or scarcity?" Brookings Papers on Economic Activity (web)

Saez, E. "Optimal Capital Income Taxes in the Infinite Horizon Model", Journal of Public Economics, 97(1), 2013, 61-74. (web)

Saez, E. “The Desirability of Commodity Taxation under Nonlinear Income Taxation and Heterogeneous Tastes”, Journal of Public Economics, Vol. 83, 2002, 217-230. (web)

Saez, Emmanuel, and Stefanie Stantcheva. “A simpler theory of optimal capital taxation.” Journal of Public Economics 162 (2018): 120-142. (web)

Saez, Emmanuel and Gabriel Zucman, “Wealth Inequality in the United States since 1913: Evidence from Capitalized Income Tax Data”, Quarterly Journal of Economics 131(2), 2016, 519-578 (web)

Saez, Emmanuel and Gabriel Zucman. 2019. The Triumph of Injustice: How the Rich Dodge Taxes and How to Make them Pay, New York: W.W. Norton, (web)

Saez, Emmanuel and Gabriel Zucman. 2019b. “Progressive Wealth Taxation” Brookings Paper (web)

Saez, Emmanuel and Gabriel Zucman. “The Rise of Income and Wealth Inequality in America: Evidence from Distributional Macroeconomic Accounts,” Journal of Economic Perspectives 34(4), Fall 2020, 3-26. (web)

Sandmo, A. “The Effects of Taxation on Savings and Risk-Taking”, in A. Auerbach and M. Feldstein, Handbook of Public Economics vol. 1, chapter 5, 1985, 265-311. (web)

Scholz, J. “Wealth Inequality and the Wealth of Cohorts”, University of Wisconsin, mimeo,2003. (web)

Slemrod, J. and J. Bakija, Taxing Ourselves: A Citizen’s Guide to the Debate over Taxes. The MIT Press, 2004.

Stantcheva, Stefanie 2020. “Dynamic Taxation,” Annual Review of Economics, 2020, 801-31. (web)

Straub, Ludwig, and Ivan Werning. “Positive long-run capital taxation: Chamley-Judd revisited.” American Economic Review 110, no. 1 (2020): 86-119. (web)

Wilhelm, Mark O. “Bequest Behavior and the Effect of Heirs’ Earnings: Testing the Altruistic Model of Bequests,” American Economic Review, 86(4), 1996, 874-892. (web)

Zucman, G. “The Missing Wealth of Nations: Are Europe and the US Net Debtors or Net Creditors”, Quarterly Journal of Economics, 2013, 1321-1364. (web)

Zucman, G. *La Richesse Cachée des Nations*, Paris: Seuil, 2012 [translation in english in 2015], summary in Journal of Economic Perspectives, 2014 (web)

Zucman, Gabriel, “Taxing Offshore Wealth and Profits,” Journal of Economic Perspectives 28(3), 2014.